Volume 89 Number 3

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

WITH Germany again on the brink of a financial precipice, President Hoover compelled to underpin his moratorium on war debts, and the security markets highly sensitive to the foreign situation, much important news in steel is consistent and has an international tinge:

Britain, France and Germany have the industrial as well as the political peace of Europe in their keeping, avers STEEL'S quarterly review (Page 25) of the European markets. For the second quarter, poor to fair is the brightest characterization of any foreign market; moderate hopes for an improved third quarter are nourished almost entirely by the moratorium.

Russia, having standardized humans, now proposes to standardize commodities (Page 27), visualizing a saving of half a billion dollars alone in the construction industries in 1932. By the end of next year, ferrous metallurgy is to be standardized 75 per cent, coal mining 100 per cent, machine tool construction 29 per cent.

Quintupling its purchases, Russia last year became the United States' best customer for metalworking machinery, making 1930 exports (Page 24) the highest since 1920 despite ebbing demand from almost all other nations. . . . Russia's recent orders (Page 26) have been a lifesaver for German steel mills. . . . And Germany, in turn, has developed a railroad track fastening which is being tested (Page 26) near Chicago.

An Extra That Needs To Be Double Czeched

Just as the parade of second quarter steel earnings is beginning to form, Czechoslovakia must strut the comfortable position of its Skoda works with the statement (Page 98) that not only is the regular 5 per cent dividend to be paid, but also an extra of $2.20. . . . In lesser degree this enviable position is shared by other steel producing countries on the Continent, according to STEEL'S weekly cable (Page 96). Holland and India are buying more heavily; sentiment in many Continental countries is lifting; Germany is bidding on more export business; but British mills cannot pierce the gloom of their depression, their June ingot output falling almost to 10,000 tons daily.

Prices Scrutinized as Red Reports Near

Perhaps it is the proximity of second quarter financial reports and the lurid red in which they are being written that prompts great solicitude for prices. In steel bars, plates and shapes, con-

Browning, N. Y. C.

"Booms": New York has plenty of them at all times, in action. Here they are placing the steel piling for another skyscraper

Municipal Savings Bank, Essen, Germany, shows modern trend of architecture in Europe

Acme—P. & A.

cessions under 1.60c, Pittsburgh, are being banned (Page 69). Cleveland has been set up as a base on plates, with Detroit at least a temporary base on bars. . . . Whatever tonnage needs are being developed for steel originate in the shape and plate markets. Hanging over the shape market is the 72,000 tons of structurals for the Golden Gate bridge (Page 90), ready to fall into the Bethlehem Steel Co.'s lap so soon as a technicality over the bridge bond issue is adjusted.

Wage Rates Follow Prices, Dividends Down

Having sacrificed prices and dividends for many months, employers now appear compelled to jettison peak labor rates. In May 46,377 steel workers accepted reductions; in the first five months of 1931 lower scales were applied to twice as many workers as in all 1930. But even so, the deduction (Page 23) from department of labor statistics is that labor has taken its liquidation more in hours than in rates. . . . Even in a year when production is not paramount, mass or synchronized vacations in order to consolidate the disruption are gaining favor. Two important manufacturers (Page 25) have announced a complete fortnight's shutdown.

Making Bethlehem Bigger and Better

Already the Anaconda of the structural steel business through the absorption of four important fabricators in recent months, Bethlehem Steel Corp. has intrenched itself in the reinforcing bar market (Page 26) by swallowing the Kalman Steel Co. . . . But acquiring so important an interest as Kalman was, in effect, less difficult for Bethlehem than concluding its annual meeting, for only after 40 adjournments (Page 25) was the session which convened April 14 formally ended July 10. . . . Some revision of plans for proposed New York structures has been necessitated (Page 33) by the standardization of the special structural sections rolled by both Bethlehem and the United States Steel Corp.

Midas Would Have Appreciated This

How many machinists are worth their weight in gold? Two such treasures are at work in the plant of a prominent manufacturer of seamless tubes, their duties including maintenance of present equipment and development of new machinery. Both men (Page 53) have unusual gifts of inventive genius and are unceasingly devising new methods for reducing costs. . . . Of great value, yet slightly below the gold standard, is another application of the thyratron tube —in the cold drawing of wire. As the wire is reeled and builds up on the spool the speed of the spool must gradually be reduced; the electric eye (Page 54) automatically maintains the proper tension.

Torches' Bite Worse than Burn

If steel becomes brittle when heated to about 572 degrees Fahr., what happens when the hot breath of the oxyacetylene torch cuts through structural sections? Nothing, for all practical purposes, as extensive research (Page 39) indicates that the temperatures rarely exceed 510 degrees. . . . Pyrometer readings of hot blast temperature at the bustle pipe of blast furnaces show wide variations between stove changes when the human element is regulating, but with automatic control equipment (Page 46) the blast temperature is more uniform, pig iron costs less to make and furnace practice is much smoother.

Zirconium a Benefactor of Steel

Many elements are employed by metallurgists to improve the physical qualities of steel and iron, zirconium (Page 41) being a comparatively recent addition to the list. . . . Since the war, domestic sources for magnesite have been favored over foreign ones despite the long freight haul which makes the cost to eastern consumers almost as great as that of foreign material. In 1913 the steel industry required (Page 56) about 10½ pounds of dead-burned magnesite refractories for every ton of steel produced; in 1923-29 the average has been only 4 pounds.

Employes Affected by Wage Reductions, 1930-31

	1930												1931					
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Totals
Iron and steel	42	.....	492	93	494	1,690	1,695	452	613	400	42	.....	869	555	4,503	110	1,102	13,062
Cast iron pipe	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43	.....	43
Structural ironwork	....	.....	18	.....	21	.....	20	38	14	14	119	173	869	765	940	47	1,596	4,634
Foundry and machine shop products	....	.....	148	695	115	93	1,570	6,008	531	176	1,355	238	1,447	1,293	796	2,979	2,932	20,376
Hardware	....	.....	.....	.....	.....	.....	.....	35	.....	.....	.....	.....	545	.....	358	327	1,131	2,196
Machine tools	....	.....	.....	.....	.....	.....	96	240	.....	24	10	.....	95	42	74	119	546	1,246
Steam fittings, etc.	....	.....	.....	.....	.....	.....	391	171	40	.....	.....	18	89	563	328	300	91	1,991
Stoves	....	.....	.....	.....	21	.....	.....	432	.....	.....	360	100	354	332	79	419	570	2,667
Totals for group	42	.....	658	788	651	1,693	3,772	7,376	1,198	614	1,886	529	4,068	3,550	7,078	4,344	7,968	46,215

Note: In the period covered by this table wage increases have affected 2118 employes. Figures from bureau of labor statistics.

Wage Reductions More Rapid; 46,000 Cut in One Month

FOR every industrial wage earner whose rates were cut in the last half of 1929 there were nine whose wages were increased.

For every one whose wages were increased in the year 1930 there were four whose wages were reduced.

And for every one whose wages were increased in the first five months this year there were 55 whose rates were lowered.

This period marked the reversal in the movement of wages, first noted in 1930, and becoming more pronounced this year, judging from reports to the bureau of labor statistics.

The reports are made voluntarily by manufacturing companies in basic industries, in response to regular monthly questionnaires for employment and wage data. The identity of the companies is not disclosed, to encourage truthful, comprehensive reports. The reports are from companies that have been employing about 3,000,000 wage earners. Information gained from this source is all that is definitely known regarding the mass movement of wage rates.

Considerably more workers were affected by reductions in the first five months this year than in all 1930—295,002, compared with 120,977.

In January this year the downward movement became more pronounced, with reductions for 43,507 reported in that month. From this high point the number diminished in February, March and April. Then in May the movement was intensified, with 46,377—more than twice the number in April. May is the latest month for which the bureau has compiled reports.

It is not assumed that the reports are complete and wholly representative of the situation, but two implications may be drawn from them: First, that by far the greater number of industrial workers so far have been affected by reduced time, rather than by reduced rates; and second, that the reduction in rates is becoming more accelerated.

The country is in the dark as to how much employes are losing, either through reduced time or reduced rates.

Few Affected in 1930

In all 1930 only 5923 workers in the iron and steel industry were affected by reductions. In the first five months this year, the number was 7139, a total of 13,062. The industry as classified by the bureau includes those companies manufacturing iron and steel and finished products.

The "iron and steel group," as classified, includes in addition to the foregoing, manufacturers of cast iron pipe, structural ironwork, foundry and machine shop products, hardware, machine tools, steamfittings and the like, and stoves.

This group reported wage reductions affecting 19,207 in 1930 and 27,008 in the first five months this year, a total of 46,215.

Iron and steel proper, with 13,062, therefore, accounts for only 28 per cent of those in the entire group. The largest number for any division in the group is 20,376, reported for foundry and machine shop products.

Structural ironwork companies have reported reductions affecting 4634; hardware, 2196; machine tools, 1246; steam fittings, 1991; stoves, 2667; and cast iron pipe, 43.

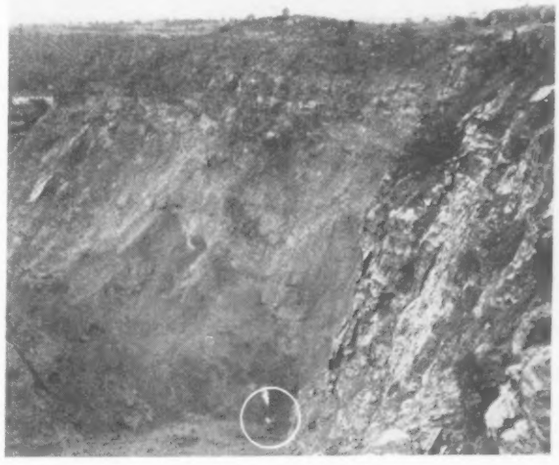
In this period—since 1929—there have been some wage increases. In January, 1930 in the basic manufacturing industries rates were raised for 21,301 workers, and decreased for only 2676.

Since 1929, increases in all have affected 35,800 industrial workers, and decreases 295,002. The "net" decreases have numbered 259,202.

In the iron and steel group increases have been applied to 2118, and decreases to 46,215. The number whose rates have been reduced exceeds the other by 44,097.

From this it is apparent that the net number of workers affected by reductions in the iron and steel group is about 17 per cent of those similarly affected in all industries reporting to the bureau.

The number of persons at work in the iron and steel group's plants represented in the bureau's survey has been approximately 490,000. Assuming that all rate reductions in this group have been reported, the number affected is a little more than 9 per cent of the total.



Sunrise iron ore mine of the Colorado Fuel & Iron Co., at Sunrise, Wyoming. A mountain of ore has been moved in the 30 years' operation of this mine. The pit is so deep, 500 feet, that the ore has been raised through a shaft. Now the caving system of mining, entirely underground, has been adopted. Note steam shovel in the pit. The ore is hauled about 300 miles to Pueblo, Colo.

1930 Metalworking Machinery Exports Best in Decade

EXPORTS of metalworking machinery from the United States in 1930 amounted to $41,945,398, an increase of about 3 per cent over the imposing figure of the previous year, 23 per cent above that of 1928, 240 per cent in excess of 1922, and greater than any year since the abnormal postwar year of 1920, according to the industrial machinery division, department of commerce, Washington.

This record was established in spite of extremely depressed conditions in important metalworking machinery markets, with the exception of Soviet Russia, and indicates the splendid reputation enjoyed abroad by American manufacturers of this type of equipment. The total export value for 1930 of $41,945,398 compared with $40,803,393 in 1929, $34,124,809 in 1928, $25,379,417 in 1927, and $18,867,522 in 1926.

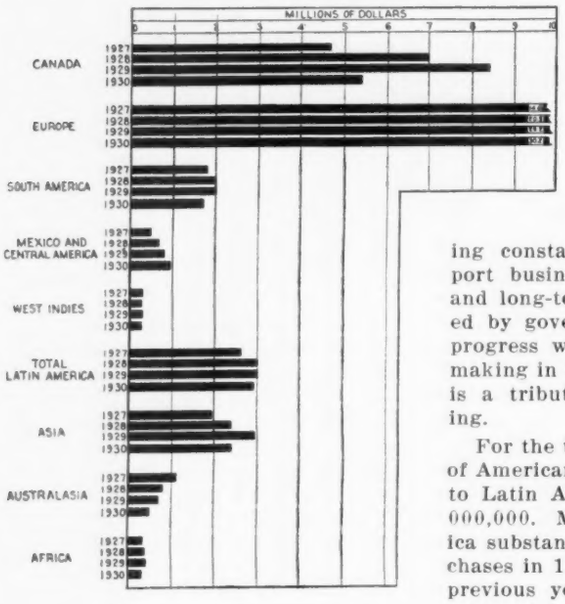


Chart showing United States exports of metalworking machinery by continental groups

Europe Takes 72 Per Cent

The outstanding feature of the year's metalworking machinery exports was the substantial gain in shipments to Europe, which amounted to over $30,000,000, or 72 per cent of the total. This trade was 20 per cent greater than similar exports in 1929, and 47 per cent in excess of 1928 shipments, due largely to increased Russian orders. The significance of this activity is particularly marked in view of the extremely competitive conditions existing in the several countries involved.

Since 1923, Europe has consumed annually more than 50 per cent of American exports of metalworking machinery in spite of the fact that manufacturers of similar equipment in the more highly industrialized nations of that area have been striving constantly to expand their export business through lower prices and long-term credits often supported by government guarantees. The progress which the United States is making in this highly technical trade is a tribute to American engineering.

For the third successive year, sales of American metalworking machinery to Latin America approximated $3,000,000. Mexico and Central America substantially increased their purchases in 1930 as compared with the previous year, while slight declines occurred in the South American and West Indian trade.

Despite a decrease of about 38 per cent in the amount of metalworking machinery purchased in 1930 as compared with 1929, Canada continued as the second most important grand division for this type of American equipment, a position which it has occupied since 1924. From the standpoint of individual countries, however, it dropped from first place in 1929 to third place in 1930, to be replaced by Soviet Russia and the United Kingdom. The total for the year under review was $5,400,000.

Of the remaining grand divisions, slight decreases were registered in 1930 as compared with the previous year. In the case of Asia sales were fairly well maintained, amounting to $2,400,000, thereby surpassing the totals established during the period 1925 to 1928, while falling somewhat below the 1929 level of $2,900,000.

Minor Declines Exist

Steady declines in shipments to the Australian-New Zealand group, which have been evident since 1927, continued during 1930, the total dropping to $536,000, as compared with $676,000 in 1929 and $1,159,128 in 1926. Sales to Africa likewise fell off, due principally to a curtailment of the demand for metalworking machinery in British South Africa. The totals for 1929 and 1930 were $450,000 and $305,000, respectively.

Exports of metalworking machinery to Europe were far greater than for any years since the abnormal activity of 1919, amounting to 72 per cent of the total shipments, due largely to the increases in purchases by Soviet Russia. This country had a record volume of over $14,000,000 worth of this class of American goods in 1930, as against $2,600,000 in 1929. By virtue of its heavy purchases during the year under re-

Principal Markets for Metalworking Machinery

Country of Destination	1926	1927	1928	1929	1930
Soviet Russia in Europe	$ 537,931	$1,046,465	$1,193,388	$2,619,658	$14,187,251
United Kingdom	4,654,007	5,721,064	6,345,090	8,282,078	6,812,275
Canada	3,214,770	4,626,481	6,937,761	8,374,795	5,409,017
France	1,581,929	2,198,424	4,690,227	6,367,240	3,192,674
Germany	1,017,824	3,175,313	2,615,427	2,134,327	2,288,719
Japan	874,491	1,238,320	1,424,664	1,686,238	1,349,061
Italy	515,165	598,786	876,730	1,497,190	951,610
Mexico	637,964	335,760	540,895	603,688	779,161
Brazil	383,243	567,543	649,160	463,981	712,290
Sweden	329,776	386,037	535,847	1,120,477	580,851
Australia	918,395	939,958	669,279	580,896	468,177
Belgium	266,408	291,183	947,494	762,511	465,076
Czechoslovakia	107,127	156,425	801,761	658,439	429,414
British India	460,951	396,905	310,102	444,899	388,455
Spain	228,633	361,901	307,975	453,061	367,101
Chile	418,926	209,907	206,274	427,179	331,064
Argentina	252,148	406,865	524,694	547,993	302,396
Netherlands	109,981	296,789	460,377	625,550	231,665
British South Africa	323,506	288,668	317,604	349,900	216,106
Netherlands East Indies	95,918	123,667	245,880	375,076	207,165
All other countries	1,938,429	2,012,936	3,524,180	2,428,217	2,275,870
Total	18,867,522	25,379,417	34,124,809	40,803,393	41,945,398

view, Russia led the list of individual markets for American metalworking machinery.

Bethlehem Meeting Ends; Notes Formally Recorded

Bethlehem Steel Corp.'s annual stockholders' meeting, which was adjourned 40 times, ended July 10 at the Robert Treat hotel, Newark, N. J., with the formal recording of votes on resolutions adopted at the first session, April 14.

The end came following the lifting of an injunction after the minority stockholders' group accepted the modified bonus plan, as reported last week.

Votes on the three resolutions were formally recorded as follows:

Resolution to adopt the annual reports—for, 680,921 shares of preferred stock and 2,153,761 of common; against, 75,008 of preferred and 310,764 of common.

Resolution approving administration of bonus system—for, 682,916 preferred and 2,156,443 common; against, 75,833 preferred and 313,346 common.

Resolution approving minutes—for, 680,931 preferred and 2,153,761 common; against, 75,028 preferred and 31,764 common.

Churchill Rodgers, as acting vice president of the company, presided.

Western Electric Down for Another Mass Vacation

Western Electric Co., Chicago, for the third successive year is giving employes a mass vacation, and 45,000 will be away this week and next. Only a small number is remaining at the Hawthorne works at Chicago for emergency work. The mass vacation plan started in 1929 is regarded by the company as a success. In 1929, the shutdown was only 64 per cent complete, but it indicated the advantage of the plan to such an extent that the procedure has been adopted since.

Timken Closes 2 Weeks

The Timken Roller Bearing Co., Canton, O., is closing its plant July 16 to 29 for the regular summer vacation, in accordance with its annual practice.

Thomas Heads Committee

Youngstown, O.—Preferred stockholders of the Empire Steel Corp., Mansfield, O., now being operated by C. H. Henkel, receiver, have organized a representative committee with W. A. Thomas, Youngstown, chairman. A small operating profit was reported for June.

Europe Sees Hope for Relief In Postponement of Debts

BY VINCENT DELPORT
European Manager, STEEL

LIKE a ray of sunshine entering through the loophole of a dungeon, the Hoover moratorium proposals reached Europe at a time when the old world could be compared to a sick man groping for a remedy. It had been no comfort for Europeans to know that American business itself was suffering for it is now realized more than at any other time that world trade conditions are closely interrelated, and that prosperous conditions cannot be realized upon while one big nerve center is more or less paralyzed.

In Europe, three countries are of primary importance in determining the coming trend of events: Germany, on whom centers the whole question of reparations, which itself reacts on business conditions; Great Britain, which exerts its influence in practically every part of the world; France, also influential, to some extent self-supporting, and whose immediate interests do not always run parallel to those of the other two big nations, the present situation being a case in point.

Undoubtedly, Germany has now reached a point where she is rapidly running downhill. At this stage her future depends largely on the decision taken by America, France and herself. Financial assistance, in which Great Britain has taken a share, already has been forthcoming. Conditions as reflected in Germany's iron and steel industry are of interest, for here is a country that was leading all Europe in methods of rationalization and efficient work.

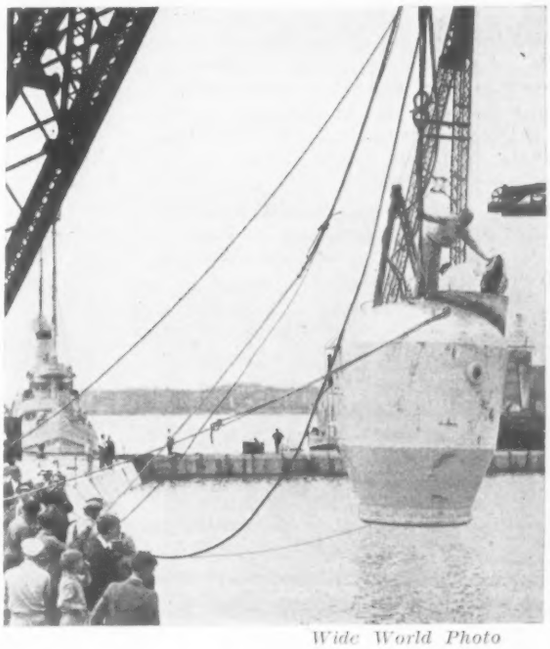
During the five months ending May 31, production of steel in Ger-

European Business Is Poor

EUROPEAN business conditions continue poor to fair, in the observation of Mr. Delport, as was the case three months ago. Only five countries tend toward fair conditions, Sweden, Holland, France, Italy and Czecho-Slovakia.

In the three countries most involved in the well or ill-being of Europe, Great Britain, France and Germany, France is the only one rating any degree of "fair." The remainder of Europe is in distinctly poor condition as to business.

All undersea craft will be equipped by the United States navy with one of these steel marker buoys at each end of the vessel. Each buoy will be equipped with means for telephone and radio communication. In case of disaster a crew will be able to release one of the buoys and send out radio messages, giving location. Surface ships brought to the scene will be able to communicate with the entrapped crew by telephone



Wide World Photo

many was 3,836,535 metric tons, compared with 5,722,903 tons in the corresponding period of 1930, a reduction of one-third. Exports of iron and steel from Germany during the first four months of the year show a decrease of 24.6 per cent in comparison with last year's tonnage during the same period. Unemployment at present is about 4,000,000, and considerable iron and steel plant is closed down, while only a few works are operating during the whole week.

Iron and steel production and exports have fallen off in still greater proportion in Great Britain; but behind Germany's decline is the country's financial weakness and an immediate drain on dwindling resources, whereas Britain still maintains its financial strength. On the other hand, if Germany can surmount her present difficulties, she has the advantage of first-rate plant equipment, method, technical knowledge and established commercial organization.

In France, the decrease in steel output is as yet only 13.6 per cent, whereas exports of iron and steel have decreased considerably less than for Germany. Also, French domestic activities, in which public works account for a substantial share, are relatively greater than in neighboring countries. On the other hand, French works are finding keen competition in foreign markets and have to accept prices which far from cover production costs. Even domestic prices are hardly remunerative. Consequently, although the French do not feel the effects of the crisis as acutely as other countries, they are well aware of its existence and they know that if the downward movement continues they will suffer, eventually, just as much as the rest of Europe.

In view of these facts, negotiations to re-establish the steel entente on a firmer basis are assuming growing importance, as it is believed that means could thus be found to restore prices to a more economic level, either by a stricter control of production, or even by control of exports. Unfortunately the problem has become involved with the question of reciprocal protection of the member countries' respective territories. As a result, parallel with the setting up of the new entente, which is making good progress, negotiations are taking place from country to country with a view to fixing limits to the sales of one member country to another.

Russia Orders from Germany

A somewhat novel aspect of the Continental situation is presented by important contracts for iron and steel products which Russia has been placing of late. Germany has captured the larger proportion of these orders, to an amount of about 300,000 tons valued at over $5,000,000. Poland also has had a share, and negotiations are being carried on between Russia and Italy, and Russia and France. These orders come as a welcome relief in enabling works to resume activities for a time. Financially, the advantages of these orders are counteracted by the long credit terms demanded by Russia.

Great Britain is passing through a period of successive minor crises, political and economic. The maintenance, or adjustment downwards, of wages looms large in the immediate future. Permeating the whole structure, and apart from the unavoidable share of the world's depression that the country has to bear, there is the fact that since the war the economic equilibrium of Britain has become completely modified, and the country is not yet sufficiently adapted to the new conditions. Great Britain is no longer mistress of world markets for coal, steel and manufactured products, now that newly industrialized nations, using modern mass production methods with lower costs, are competing with all their strength.

From the beginning of the year to May 31, British output of steel was 2,221,200 tons, against 3,761,600 tons in the corresponding period of last year, a decrease of 41 per cent. Exports of iron and steel decreased from 1,546,571 tons in the first five months of 1930 to 836,596 tons for the same period this year, a drop of 45.7 per cent. This year, for the first time, imports have exceeded exports by 193,847 tons. Unemployment is around 2,600,000 and prevails mostly in coal mines, shipyards and the textile industries. The electrical, automobile, and chemical industries are not suffering so much and are, in fact, fairly flourishing.

Bethlehem Buys Kalman Steel Co. and Expands in Reinforcing Bar Field

BETHLEHEM STEEL CORP., Bethlehem, Pa., continues its expansion in the building steel field by purchase of the Kalman Steel Co., important concrete reinforcing bar fabricator and warehouse interest, with headquarters at Chicago.

Already this year Bethlehem has added well over 1,000,000 tons to its capacity for fabricating structural steel through acquisition of the McClintic-Marshall, Hay Foundry & Iron, Levering & Garrigues and Hedden Iron Construction companies.

Now, by adding the facilities of the Kalman company, Bethlehem complements its expansion in the structural field by becoming more competitive in the allied building steel line—reinforcing bars.

No definite announcement has been made but it is assumed that the Kalman name will be retained and its activities prosecuted in much the same manner that the McClintic-Marshall activities have been continued.

In recent months the Kalman company, which was incorporated in 1920 as the Paul J. Kalman Co. and changed to its present title in 1922, has gradually withdrawn from the eastern field. It disposed of its Jersey City, N. J., plant to the Tidewater Structural Materials Corp., and had its Philadelphia unit on the market.

In addition to plants at Philadelphia, Boston, Buffalo, Youngstown, O., and St. Paul, the Kalman company has two plants at Chicago, where its general offices have been located. The Chicago plants include a reinforcing bar warehouse and fabricating plant at 6514 South Austin avenue, in the Clearing industrial district, and a plant for fabrication of wire goods at 1844 West Austin avenue.

The combined annual capacity of the Kalman plants is about 100,000 tons of steel building materials and wire products. The company also produces metal lath, steel joists, and allied steel building material products. George E. Routh Jr. is president of the company, and Paul J. Kalman is chairman of the board.

Sheet & Tube Stock Value Case Again Postponed

Youngstown, O. — Hearing of Youngstown Sheet & Tube Co. minority shareholders' case for determination of a fair cash value for their stock has been postponed again, to Aug. 14, on application of counsel for the company and the petitioners.

The Bethlehem-Sheet & Tube merger suit which was decided in common pleas court adversely to the merger proponents still is pending before the circuit court of appeals, with no hearing in prospect until October.

Try German Fastening

Chicago—A new type of track is being laid by the Chicago, Milwaukee, St. Paul & Pacific railroad on its main line between Franklin Park and Elmwood, Ill., a distance of about 30 miles. The road's installation of the new track, which was developed

by the German state railways, is experimental only.

Chief features are a heavy metal plate, fastened to the tie with long screws; a special pressed-wood pad, between the top of this plate and the base of the rail, and a device that holds the rail to the plate.

Foundrymen's Association Installs New Officers

New officers of the American Foundrymen's association, recently elected, were installed at the annual meeting of the board of directors in Toronto, Ont., July 9. Called by the retiring president, N. K. B. Patch, Lumen Bearing Co., Buffalo, the meeting was attended by 20 members of the old and new boards.

Incoming officers were: President, E. H. Ballard, superintendent of foundries and pattern shop, General Electric Co., West Lynn, Mass.; vice president, T. H. Hammond, president, Whiting Corp., Harvey, Ill., and secretary-treasurer, C. E. Hoyt, 222 West Adams street, Chicago.

Members of the executive committee to serve during the 1931-32 period are: Chairman, N. K. B. Patch; D. M. Avey, *The Foundry*, Cleveland; Frank J. Lanahan, Fort Pitt Malleable Iron Co., Pittsburgh; and Fred L. Wolf, Ohio Brass Co., Mansfield, O.

A committee was appointed to select the city for the 1932 annual convention of the association.

Miners Called to Capital Conference on Coal Strike

Washington—Representatives of the United Mine Workers have been called into conference for this week with Secretary of Labor Doak and Secretary of Commerce Lamont to discuss the strike situation in western Pennsylvania, Ohio, West Virginia and Kentucky. Last week a group of operators met with the department secretaries but expressed the belief nothing could be done by calling a joint conference of operators and mine union officials at this time.

Blows In Second Furnace

National Tube Co. blew in a second blast furnace at its Lorain, O., plant on July 13. Since June 13, when the company blew out its No. 5 furnace, only one unit has been active.

May Bid on Destroyers

Washington—Private shipyards will be given opportunity to bid on 10 new destroyers for the navy, first vessels of this type to be constructed since the World war.

Russia Pins Much Faith on Profit from Waste Elimination by Standardization

ADOPTING the standardization methods developed in the United States and in the leading industrial nations of Europe, Russia has embarked upon a tremendous industrial standardization program which its proponents claim is already saving hundreds of millions of dollars annually and which promises a saving of billions of dollars before the completion of the five-year plan.

Russia has adapted foreign standardization methods to her own needs and by means of newspapers and popular standardization magazines has enlisted the entire population in a mass movement aimed to eliminate waste by means of standards. In the various construction industries alone nearly half a billion dollars will be saved during 1932 through standardization, D. G. Budnevich, vice president of the U. S. S. R. standards committee, claims in an article in the bulletin of the American Standards association.

Even Small Items Changed

No item in the industrial program is considered too small to be included within the scope of the standardizers. Pins, hooks and eyes, for example, have been standardized, with the result that an annual saving of over 100,000 rubles ($50,000) has been achieved. In doing this, 100 tons of metal have been saved for other uses.

The following examples of other savings are quoted from the article:

At the end of 1930, the standardization committee approved a standard on the ash content of coking coal. By this standard the ash content of coal should be reduced to two per cent below the average for 1930. This will result in setting free about 60,000 freight cars, and in an increase of 500,000 tons in the production of metallurgical plants of the union without the least increase in expenditure. The increase in production noted above is due to the fact that an extra ash content of one per cent in coal will reduce the output of blast furnaces by 2.5 per cent, which would thus result in a production loss of 280,000 tons of metal for each one per cent of extra ash content.

Commenting on savings rendered possible by standardization, Mr. Budnevich says:

Goal for Efforts Is Set

It is quite apparent and irrefutable that standardization conforming to the socialistic development of the Union must become the technology of socialistic construction and be a component of our technological policy. Indisputably, standardization as a principle and a guide to action, being a bridge to large-scale socialistic production, must become one of the cornerstones of our technical progress.

By the end of 1931 our industries will be standardized to the following extent:

	Per cent
Coal mining	100
Petroleum industry	61.3
Metal mining	60
Ferrous metallurgy	75.5
Nonferrous metallurgy	70
Chemical industry	74.6
Building materials	91
Machine construction	28.7

Quarter's Shipments Up

Cutler-Hammer Inc., Milwaukee, reports second quarter shipments valued at $1,684,000, against $1,667,000 in the first quarter. For six months, shipments amounted to $3,351,000 against $5,205,000 in the similar period of last year.

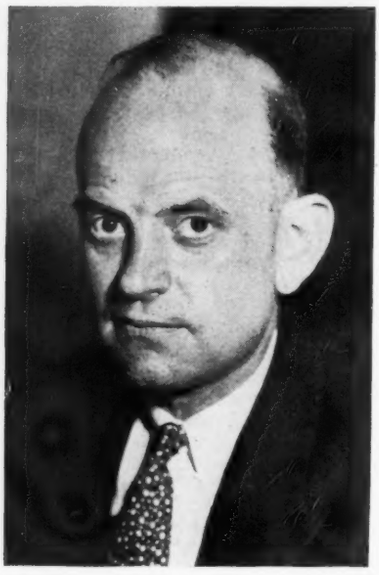
Photo Courtesy of Armco Culvert Manufacturers Association

MAKING IT EASY FOR HORSES TO DISPLAY HORSE SENSE

Typical of the "safety first" motive of western ranchmen is this 72-inch corrugated steel culvert which permits horses in Yosemite valley of California to reach their favorite waterhole without crossing dangerous railroad tracks

Industrial Men in the Day's News

C. H. Butts, Vice President in Charge of Operations, Newton Steel Co.



ALTHOUGH born in Ohio, he began his industrial career in the British northwest, with Canadian Western Steel Co.

ADVANCING from shipping clerk to plant superintendent in four years, the end of the World war terminated his connection.

HE then became affiliated in turn with American Rolling Mill Co., General Motors Research Corp., and Newton Steel Co.

C. H. BUTTS, recently named vice president in charge of operations at both the Newton Falls, O., and Monroe, Mich., works of Newton Steel Co., Youngstown, O., started in the steel industry in northwestern Canada, although he was born at Greenville, O., and received his education at Dayton, O. His first connection was in 1914, with Canadian Western Steel Co., Calgary, Alta., formerly Redcliff Rolling Mills & Bolt Co. Ltd., with busheling mills at Redcliff and Medicine Hat, Alta. Beginning as a shipping clerk, Mr. Butts was advanced through various positions until finally he became plant superintendent. The signing of the armistice of Nov. 11, 1918, ended the World war activities of this company and likewise terminated Mr. Butts' 4-year affiliation with it.

Within a short time, however, he entered the employ of American Rolling Mill Co., Middletown, O., being identified with its open-hearth laboratory. Later, as chemist, he worked in the open-hearth department, and in 1921 he was assigned to the efficiency department.

Early in 1922 he left the Rolling Mill company to enter the employ of General Motors Research Corp., Dayton, O., where for three years he was assistant metallurgist. In February, 1925, he started his identification with Newton Steel Co. He was appointed director of research and had control of the laboratory. In May, 1928, he was appointed assistant to the vice president, and six weeks ago he became vice president in charge of operations in succession to C. B. Pollock, resigned, as noted in STEEL of May 21.

He is a member of American Iron and Steel Institute and also of American Society for Steel Treating.

WILLIAM J. KIBLER was recently elected president of Buffalo Steel Co., Tonawanda, N. Y., to succeed the late J. G. Joseph. Mr. Kibler has been vice president of the company and in that capacity has been succeeded by August E. Klinger. Both officials have been with the company for more than 20 years.

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Henry J. Beam, formerly identified with Anchor Steel & Engineering Co., Detroit, now is sales director for Euclid Investors Inc., Detroit.

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Norman Huston, who resigned June 30 as New York district sales manager for Alan Wood Iron & Steel Co., Conshohocken, Pa., has been appointed district sales manager in the New York territory for the Central Iron & Steel Co., Harrisburg, Pa. He succeeds G. C. Fogwell, who has been assigned to special duty with headquarters at the company's home office at Harrisburg.

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O. P. Williams has been appointed sales representative for Carson, Marshall & Co. Inc., Franklin Trust building, Philadelphia, seller of pig iron, coke and coal. He has been identified with the pig iron industry for many years.

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E. K. Smith, formerly with Stockham Pipe & Fittings Co., Birmingham, Ala., has been appointed metallurgist of Electro Metallurgical Sales Corp., New York. His headquarters will be in the Carbide & Carbon building, North Michigan avenue, Chicago.

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E. D. Kaser has been elected president and general manager of the Durabilt Steel Locker Co., Aurora, Ill. He has been with the company since it was founded in 1921. He succeeds C. W. Killian, who resigns as president but remains as board member and large stockholder. Other officers are: V. C. Kaser, vice president; H. S. Hatch, treasurer and manager of sales; and W. H. Graham, secretary.

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E. A. Emerson, president, Armco International Corp., export subsidiary of American Rolling Mill Co., Middletown, O., has been appointed chairman of the foreign trade committee, Cincinnati chamber of commerce. Other members of the committee are: R. S. Alter, Herbert D. Moebus, C. D. Oesterlein, Ralph Pappenheimer and C. L. Thomas.

Mr. Emerson has been active in

promoting better foreign trade relationships and has represented the Cincinnati chamber of commerce at numerous foreign trade conventions. He took up export work in 1911, establishing Americon Rolling Mill Co.'s first export office in Brazil.

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C. N. Johns was recently appointed general manager, with headquarters at Monessen, Pa., of Page Steel & Wire Co., Bridgeport, Conn.

W. H. Bleeker Jr. now is sales manager, with offices at 701 American Bank building, Pittsburgh.

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Arthur E. Painter, formerly with the Riverside Steel Casting Co., Newark, N. J., now is district sales manager at New York for Atlantic Steel Castings Co., Chester, Pa. His headquarters are at room 1908, 370 Lexington avenue, New York.

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Edward A. Small Jr., formerly sales engineer, Jones & Laughlin Steel Corp., Pittsburgh, has been appointed field engineer for A. M. Byers Co., Pittsburgh, with headquarters in the Conway building, Chicago. He is a member of the Western Society of Engineers.

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E. E. Robbins, with headquarters at Tulsa, Okla., has been made division sales manager, Oil Well Supply Co., Oil City, Pa., subsidiary of United States Steel Corp. His territory comprises the mid-continent, Gulf Coast, Rocky Mountain and Canadian fields.

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G. D. Spackman, president of Lukenweld Inc., subsidiary of Lukens Steel Co., Coatesville, Pa., since its organization in July, 1930, has been appointed chairman of the American Welding society's committee on the use of welded steel parts for the construction of machinery.

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A. J. Brandt, identified with main office of Steel & Tubes Inc., Cleveland, for some time, has been appointed western sales manager, with headquarters at 1330 Peoples Gas building, Chicago. He will have jurisdiction over Chicago, St. Louis, Minneapolis and Kansas City districts.

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Walter S. Moody, identified with the engineering department of General Electric Co., Pittsfield, Mass., for 43 years, has resigned to become consulting engineer. He was born in Chelsea, Mass., and was graduated in 1887 in the first electrical engineering class at Massachusetts Institute of Technology.

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Samuel Mather, senior partner of Pickands, Mather & Co., Cleveland, celebrated his eightieth birthday July 13. At noon on that date employes, through their spokesman, H. G. Dalton, presented Mr. Mather with a book expressing their esteem and regard, signed by all employes of the company.

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Ellsworth L. Mills, formerly sales manager for Bastian-Blessing Co., Chicago, maker of welding equipment, etc., has been elected vice president and continues in charge of sales. He has devoted himself to the possibilities of the welding field ever since he was graduated as an engineer from Cooper Union institute.

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David E. Ross, formerly vice-president and general manager of Ross Gear & Tool Co., Lafayette, Ind., has been elected president to suceed Edward A. Ross, who died July 10, in London, England. The new president four years ago resigned as vice president and general manager to give his time to research work at Purdue university, of which he is a trustee.

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H. C. Atkins, president, E. C. Atkins & Co., Indianapolis, manufacturers of saws, etc., has been named president of the Manufacturers Natural Gas association, which is endeavoring to bring natural gas from Kentucky and the Panhandle district to Indianapolis. James S. Watson, of the Link-Belt Co., Indianapolis is a director of the organization.

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Walter S. Gifford, president, American Telephone & Telegraph Co., New York, was elected a member of the finance committee of the United States Steel Corp., New York, at a special meeting of the board. He succeeds George F. Baker, deceased, whose place on the directorate has been filled by the election of Sewell L. Avery, president, United States Gypsum Co., Chicago.

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William H. Mantz, Atlas Foundry Co., Irvington, N. J., was elected president of the newly-organized New Jersey Foundrymen's association. Other officers follow: H. L. Edinger, Barnett Foundry & Machine Co., Irvington, vice president; J. A. Williamson, Isbell-Porter Co., Newark, N. J., treasurer; and G. W. Hannah, Barnett Foundry & Machine Co., secretary.

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R. L. Leffler, formerly assistant superintendent of tool shops, Duquesne works, Carnegie Steel Co., Pittsburgh, was appointed superintendent of blooming mills, roll shops and chipping. Other recent appointments at that plant follow: J. S. Tannehill, assistant superintendent in charge of rolling; D. A. Crowley, assistant superintendent in charge of chipping; K. H. McLaurin, master mechanic.

G. J. Bryen, master mechanic, and R. H. Shick, superintendent of rolling mills, retired July 1.

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Lindsay M. Donaldson, of New York, has been appointed general manager of Massey-Harris Co., Racine, Wis. For many years he has been associated with B. W. Burtsell, president of the company, in various industrial enterprises, and has devoted much time to finance, sales and advertising.

George White continues as vice president of Massey-Harris Co., Racine, but subsequent to Aug 1 will be located in Toronto, Ont., as general sales manager of the entire Massey-Harris Co. Ltd. organization.

W. M. LaVenture continues as secretary-treasurer of the Racine company.

David Selheimer, formerly production manager at Racine, has been appointed factory manager and in addition will supervise the purchasing and experimental departments.

Obituaries

HARRY J. MARKS, 35, president of the Federal Steel Corp., Detroit, was drowned July 13 in Lake Erie at North East, Pa., while endeavoring to rescue his two nieces, one of whom also drowned. Prior to about 1920 Mr. Marks was identified with Fishel & Marks, Cleveland, scrap iron and steel dealers, but left at that time to locate in Detroit. He with others formed the Marks, Fiske, Zeiger Co., Detroit, to sell plates, shapes, sheet and strip steel. Later he organized the Federal Steel Corp. to engage in a similar line of business, specializing in material cut to size.

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Van R. Kipka, secretary-treasurer of Elkhart Iron Works, Elkhart, Ind., died recently.

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John T. Shea, business manager of the American Steel Grave Vault Co., Galion, O., died there July 2.

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John J. Mahoney, 74, president, California Pipe Line Machine Co., Kansas City, Mo., died June 26.

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Harry J. Parke, 67, who for almost 30 years has been purchasing agent of Gisholt Machine Co., Madison, Wis., died July 6.

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Col. Andrew B. Lea, 53, at one time an engineer for the American Steel & Wire Co. at Cleveland, died July 5.

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George W. Johnson, 65, president, George W. Johnson Mfg. Co., Kansas City, Mo., manufacturer of steel rolling doors, died June 8.

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Edward A. Ross, 46, president of Ross Gear & Tool Co. and Fairfield Mfg. Co., both of Lafayette, Ind., died recently in a London, England, hospital. Mr. Ross was graduated

from Purdue university in 1907 and soon became affiliated with the Ross company. Four years ago he became head of the Fairfield company.

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Clinton R. Steinle, 35, secretary-treasurer, Steinle Turret Machine Co., Madison, Wis., died suddenly July 2. He was son of George A. Steinle, founder of the company.

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J. R. Francis, 60, founder of Marvel Carburetor Co., Flint, Mich., died recently at Miami Beach, Fla. He was a vice president of the Borg-Warner Co., Chicago.

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Frederick P. Pool, for 28 years buyer and treasurer for Hibbard, Spencer, Bartlett & Co., Chicago, wholesale hardware and steel jobber, died recently in that city.

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John Brisben Walker, 84, magazine publisher who died at Brooklyn, N. Y., July 7, was in the iron manufacturing business in the Kanawha valley of West Virginia from 1870 to 1873.

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William H. Farnsworth, 83, chairman of the board, of National Grinding Wheel Co., Tonawanda, N. Y., died July 12 at Buffalo. He retired from active business life in 1926 after long association with the industrial interests of the Buffalo district.

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Francis W. Fitzpatrick, 67, consulting architect, Evanston, Ill., died July 11. Mr. Fitzpatrick pioneered in the design of fireproof steel constructed skyscrapers and was active in the development of modern architectural practices. Recently he had been working on projected patents for steel construction in small buildings.

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Michael P. Reagan, 63, for the past five years blast furnace superintendent for Struthers Iron & Steel Co., Struthers, O., died July 8 at Youngstown, O. Prior to his Struthers connection he was for 12 years superintendent of the Hannah blast furnace of Republic Iron & Steel Co., now Republic Steel Corp., Youngstown. He was employed by the Republic company for 28 years.

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James E. Stacey, 74, former head of the Stacey Engineering Co., Cincinnati, which combined with the International Derrick & Equipment Co., Columbus, O., recently to form the International-Stacey Corp., died July 6 at his home in Wyoming, O., a suburb of Cincinnati. Mr. Stacey had been active in the manufacturing and public utilities field for more than 50 years after becoming connected with the Stacey Mfg. Co., which was founded by his father.

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John L. Agnew, 47, vice president, director and member of the executive committee of International Nickel Co. of Canada Ltd., died at his home in Copper Cliff, Ont., July 8. He was in charge of the company's operations in both Canada and Great Britain. He also was director of International Nickel Co. Inc., New York, and served as deputy chairman and director of Ontario Refining Co. Ltd., in which the nickel company has a 42 per cent interest. He also was director of Smith & Traverse Co. Ltd., and of the Bank of Toronto. Born in Pittsburgh, Mr. Agnew, after some experience in the iron and steel industry in that section, located in Canada in 1904, joining the staff of Canadian Copper Co., which later became the International Nickel Co. of Canada Ltd. He was past president of Canadian Institute of Mining and Metallurgy; past president of Ontario Mining association and past vice president of American Institute of Mining and Metallurgy.

Cut Rates To Meet Trucks

Boston — Department of public utilities of Massachusetts has authorized the Boston & Maine railroad to reduce carload freight rate on iron, steel and wire articles from or to Worcester and Clinton, Mass., to or from Boston and Watertown, from 11½ cents per 100 pounds to 10 cents to meet competition from motor trucks.

Probes Railroad Practices

Washington—Interstate commerce commission has initiated on its own motion an investigation of certain practices of the railroads regarding spotting of cars at industrial plants, prices paid for fuel, practices in connection with handling coal at tidewater points and at lake ports. This new investigation ties in with the 15 per cent rate case and hearings will be held at points to be designated later.

Continental Books Orders

Contracts for sheet metal products which will keep the Continental Steel Corporation plant at Kokomo, Ind., in operation for several weeks have been announced by D. A. Williams, president and general manager. The orders will require operation of two of three open-hearth furnaces for a month.

Youngstown Opposing Freight Rate Rise; Hearings Opened This Week

WASHINGTON — Youngstown, O., chamber of commerce, first trade body in an important steel center to take a definite stand on the railroads' petition for a 15 per cent advance in freight rates, is expected to file a protest against the advance late this week.

The National Hardwood Lumber association has entered a protest, proposing a cut in railroad wages instead. The Manufacturers' Association of Connecticut also has put in its opposition. Among organizations favoring the advance are New York board of trade, Queensboro chamber of commerce, St. Louis chamber of commerce and American Tobacco Co.

Prior to opening the public hearing on the case July 15, with arguments in favor of the advance being heard first, the interstate commerce commission announced that the valuation of the railroads as of Dec. 31, 1930, was $21,691,000,000. It is the return on this valuation which the commission will consider in deciding whether to grant the 15 per cent rise.

At present there is no indication how long the argument in favor of the advance, which opened July 15, will consume. Testimony opposed to the advance will be heard by the commission beginning Aug. 31. The commission and various state regulatory bodies have agreed that representatives of the latter will sit with the commission as a co-operating committee.

Appointment of W. D. B. Ainey, chairman of the Pennsylvania Public Utilities commission, and Herbert W. Thrafton, of the Maine commission, to represent the eastern rate group on the co-operating committee was announced by the National Association of Public Utility and Railroad Commissioners.

Harvey H. Hannah, chairman of the Tennessee commission, and Hugh White, president of the Alabama commission, were named to represent the southern group. Paul A. Walker, chairman of the Oklahoma commission, and Andrew R. McDonald, of the Wisconsin commission, represent the western group, while William J. Carr, of California, has been assigned as the representative of the Mountain Pacific group.

Commissioners Meyer, Lewis and Lee presided at the opening hearings. Assigned as their assistants were Examiners Disque, Mattingly and Hosmer, in addition to the state co-operating committee.

Here and There in Industry

FULTON IRON WORKS CO., St. Louis, has been merged with the Goslin-Birmingham Mfg. Co., Birmingham, Ala., a subsidiary of the Whiting Corp., Harvey, Ill., awaiting only ratification by creditors and stockholders. The stockholders' committee and directors of the Fulton company already have approved the merger. The effect of the consolidation will be to give a diversified line of products to the Fulton company, including cranes, foundry machinery, diesel engines, power plant equipment, pumps, filters and chemical machinery. Previously its products have been confined largely to machinery for the sugar industry. Additional working capital is to be supplied by the Whiting Corp., giving balanced assets of about $4,000,000.

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Structural Steel Painting Co., Buffalo, has opened offices in the Shelton Square building.

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Buffalo Pumps Inc. succeeds the Buffalo Steam Pump Co., North Tonawanda, N. Y., the change being merely one of name.

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Rockford Bolt Co., Rockford, Ill., has been reorganized and reincorporated as the Rockford Bolt & Steel Co. Its principal product is bolts.

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Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has taken an order from the Puget Sound Power & Light Co., Seattle, for a 25,000-kilovolt-ampere synchronous condenser.

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S. R. Dresser Mfg. Co., Bradford, Pa., has taken an order for couplings for 180 miles of 26-inch pipe to be laid in Kansas by the Missouri Valley Gas Co.

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Apex Machine & Tool Co., Dayton, O., has taken over the McArthur Machine Co., and has increased its capital from $75,000 to $175,000 to finance the larger operation.

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Jessop Steel Co., Washington, Pa., is installing an additional electric melting furnace, two annealing furnaces and a 3-ton forging hammer. Buildings are being extended to accommodate the new equipment.

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Page Steel & Wire Co., Bridgeport, Conn., has appointed C. N. Johns general manager, with headquarters at Monessen, Pa., and W. H. Bleecker Jr. sales manager, with headquarters at 701 American Bank building, Pittsburgh.

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Schill Bros. Plow Co., Crestline, O., has been reorganized and has elected F. P. Hayes, Crestline, president; E. B. Beall, Galion, vice president; E. T. Remy, Crestline, secretary. O. F. Kime, Dr. J. W. McCallum and the officers form the board of directors.

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Globe Steel Tubes Co., Milwaukee, has let the general contract to the Worden-Allen Co., Milwaukee, for a tube mill addition, 84 x 116 feet, at 3839 West Burnham street. An investment of about $50,000 in building and equipment is planned. Frank J. O'Brien is president and general manager.

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Superior Die, Tool & Machine Co., Columbus, O., has been reorganized and reincorporated after a receivership, under the same name as formerly. The operative personnel is unchanged. J. E. Finneran is president and treasurer, P. J. Holstein vice president, and W. J. Bennett secretary.

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A-C Metal Specialties Inc., Milwaukee, has bought the equipment and goodwill of American Sash Pulley Corp., Velguth Metal Parts Inc. and Acme Automotive Accessories Co. and moved them into a large plant. With these added facilities the A-C company will furnish complete assemblies from making of dies to plating or lacquering.

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Franks Mfg. Co., Tulsa, Okla., has been organized by H. H. Franks, formerly machine shop superintendent for the Tidal Oil Co., at Tulsa, and Carl White Jr., to manufacture and repair oil field equipment. The Tidal Oil Co. shop building and equipment has been leased by the new company, the former recently suspending operations at this plant.

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Aluminum Goods Mfg. Co., Manitowoc, Wis., has acquired a substantial interest in the Aluminum Co. of Canada Ltd., Toronto, Ont., and is organizing a new corporation, Aluminum Goods Ltd., to continue the business. C. M. Salter, associated with the Canadian interest for many years, will become president and general manager. George Vits, president of the Manitowoc company, will become chairman of the board, with A. J. Vits and H. L. Vits of Manitowoc also members of the board. The principal product of the two concerns is aluminum kitchenware and other utensils.

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Murray Tool & Supply Co., Cleveland, Okla., manufacturer of oil field supplies, has moved its general offices to the Philtower building, Tulsa, Okla., following consolidation of the Cleveland operating and executive departments with the sales office at Tulsa. The manufacturing plant will remain at Cleveland. James M. Murray is president.

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Benson Electrical Co., Superior, Wis., manufacturer of electrically-operated winches, steering gears, and other marine equipment, is making a survey with a view of relocating its plant and offices in Milwaukee. The main reason given is that many of the parts entering into its product are made in Milwaukee, including those of Cutler-Hammer Inc., Falk Corp. and other concerns.

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Allis-Chalmers Mfg. Co., Milwaukee, has added 178,178 shares to its capitalization in acquiring the Advance-Rumely Corp. and the electrical departments of the American Brown-Boveri Electric Corp. Not more than 114,500 shares will be used in the Advance-Rumely purchase and 85,000 shares in the Brown Boveri purchase. The remaining 21,322 shares will be taken from treasury stock.

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Armstrong Cork Co., Lancaster, Pa., is consolidating the Cincinnati branch sales offices and warehouses of its various divisions at 232 West Seventh street. The divisions affected and their former locations are: Armstrong Cork Co., floor sales division, 538 Dixie Terminal building, cork sales division, 1017 Broadway; Armstrong Cork & Insulation Co., insulation sales divison, 1015 Broadway. A division known as the Temlok dealer sales division, recently organized, will be housed with the other divisions.

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Hardinge Bros Inc., Chicago, manufacturer of machine tools, has been acquired by interests connected with the Morrison Machine Products Co., Elmira, N. Y., and is being moved to a plant adjacent to that of the latter. Control and management is in the hands of Douglas G. Anderson, president, L. R. Evans and J. R. O'Connell, of the Morrison company. Henry Nelson, vice president of the Hardinge company, will be sales manager. Financing of the purchase has been done by sale of stock in Elmira.

Fairchild Aerial Surveys

BEAMS FROM BROADWAY

NEW YORK

BORING far below towering buildings of three New York boroughs, city streets, rivers and parks, the Board of Water Supply, with Patrick McGovern Inc., general contractor, has turned into the last half of one of the most gigantic engineering projects ever attempted, water tunnel No. 2 from the Hill View Reservoir to a far point on Hamilton avenue, Brooklyn.

Steel and dynamite are making possible this giant tube, 17 feet in diameter, finished and lined, 550 feet below the Bronx, Queens, Brooklyn, Rikers island and the East river. For three years men have been battering solid rock with steel drills, and, for three years more, work will continue in the tunnel and shafts before the water is turned on. The tunnel with mechanical equipment will cost $45,000,000.

Thousands of tons of steel and manganese bronze castings have been bought and remain to be purchased for this tunnel, which includes 17 shafts, all but four of which have been holed through. The main tunnel has been practically drilled and is being lined.

Costs Below Estimates

Mechanical equipment alone, which is being purchased through the office of Ray C. Ewry, Board of Water Supply engineers, calls for more than 1,000,000 pounds of steel castings for valves and fittings and about 4,000,000 pounds of manganese bronze for valves, gates, doors.

Mechanical equipment costs will approach $3,000,000, but far below early estimates. Some of the largest bronze valve castings ever made are going into this tunnel. Under the McGovern contract, 7,500,000 pounds of steel interlining has been placed, fabrication being by American Locomotive Co. at Dunkirk, N. Y., steel being rolled by the Bethlehem Steel Co. Chambers are taking a large tonnage of steel pipe castings.

Structural steel is being used as roof support in places where weak glacial rock formation is found. Some of this structural steel will be left in the tunnel for permanent support. Each of the 17 shafts carries thousands of pounds of bronze and steel mechanical equipment.

Building for the Ages

Some of the gates and valves once having been placed are expected to operate, in many instances automatically, for generations. In such cases water can not be entirely shut off for repairs. The job must be right the first time. This is especially true of section valves.

In several Brooklyn shafts considerable steel piling is being used. Tunneling work is approximately 90 per cent completed and some parts are already lined with cement.

Contracts are expected to be let this fall for another New York city water tunnel between Kensico and Hill View, the contract to cover approximately 15 miles.

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Brooklyn bridge recently had a birthday. For 48 years this monument to Roebling has been suspended over the East river. The bridge has consumed many tons of red lead. Recent inspections reveal steel in superstructure and cables as good as the day it was installed.

Care has much to do with preserving the material, which is exposed to all weathers. Department of Plants and Structures crews are constantly working on this, and other New York bridges, chipping and painting. About once in every six years the bridge is given a complete new coat.

Old Brooklyn bridge, still the pride of native New Yorkers, stands after 48 years as sturdy as ever, the first of the long suspension spans. Yet a few days after it was opened, scores were killed and injured on the bridge when a rumor spread among the joy-seekers that the structure was about to drop into the East river.

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Structural steel, as a rule, gets two coats of heavy paint before it disappears in the walls of the structure it made possible. The first is of various hues of red, the second black. Red is applied at the shop, the black on the job as it is being erected.

There appears to be no specific reason for these colors, other than contrast. The difference in the colors is so great the painter applying the second coat thoroughly covers all the surface, or the red looms sharply against the black.

Derrick Colors Advertise

Some years ago fabricators used distinctive colors, some painting beams yellow, red, green and other shades. This plan has been gradually abandoned. But even now most erector-fabricators carry out an individual color scheme in their derricks. Leading erectors have yellow, red, green, buff and black derricks, to mention a few. An experienced observer can almost instantly tell the erector and fabricator of steel going into a given job by the color of the derrick.

Some fabricators stencil the firm

name in sharply contrasting color over the first coat of red. Several of the largest shops do this. But the firm name disappears under the second coat of black. Initials and names on derricks also serve to advertise the steel contractor, although this proves of little value after the derricks go up a few stories.

On most large jobs, also, the steel contractor displays on the shelter platform the firm name as prominently as does the general contractor. However, on a surprising number of steel jobs the sections go up without any distinctive markings as to the mill or fabricator on either the beams or derricks.

Beams Are Standardized

Abandonment of certain rolls as the result of wider standardization of H beams by the two largest producers of plain structural material, making these sections practically interchangeable, has resulted in some changes in structural design in buildings for which plans had been completed. The standard section plan became operative July 1 with Bethlehem Steel Co. and United States Steel Corp. It should result in fewer roll changes and fewer sizes to be carried in stock.

Among the buildings already planned in which some changes were made is the Port Authority inland freight terminal which will take 22,500 tons of structurals, bids to go in on general contract after Sept. 8.

Other specifications for this building cover one of the most extensive sprinkler systems ever installed, taking thousands of sprinkler heads and more than two million feet of various sized pipe. For heating and plumbing welded pipe is being considered, but final action still pends as to this.

The structure will also take 145,000 feet of steel sash, 4800 tons of concrete bars, 2000 feet of sidewalk bridges, 9000 square feet of storefront bronze and 838 tons of miscellaneous cast iron.

Playing with Lightning

Well grounded by thousands of tons of steel in its frame, the Empire State Building has little to fear from lightning, and, towering a quarter of a mile in the air, the world's tallest building also protects hundreds of other buildings in the Manhattan midtown section. Experiments with 5,000,000-volt bolts of artificial lightning in the high-voltage laboratory of the General Electric Co. show the structure affords protection from lightning to all buildings within a considerable radius of it, with the possible exception of one or two nearby skyscrapers.

New York's skyline in miniature was used for the tests. Bolt after bolt of the 5,000,000-volt man-made lightning was hurled downward. Each time the pinnacle of the Empire State Building was struck. No damage was done, however, since the model was well grounded, as is the original building.

The area of protection is cone-shaped, such as would be included by a line drawn from the top of the building to a radius of about 2.5 times the building height for clouds a mile high. However, the area of protection might be reduced to a radius equalling the height of the building should the storm cloud be exceptionally low, such as a quarter of a mile.

For low buildings the protector radius may be four times the height of the building. Thus, although a tall building protects a greater area than does a low one, its efficiency is relatively less. This follows because the taller building more nearly approaches the clouds in height.

The protected area plan has already been adopted in the safeguarding of oil storage tanks in southern California. Tall rods, placed near the big oil reservoirs, provide overlapping protected areas, thus greatly reducing the hazard of conflagrations from lightning flashes.

Buying Pig in Poke

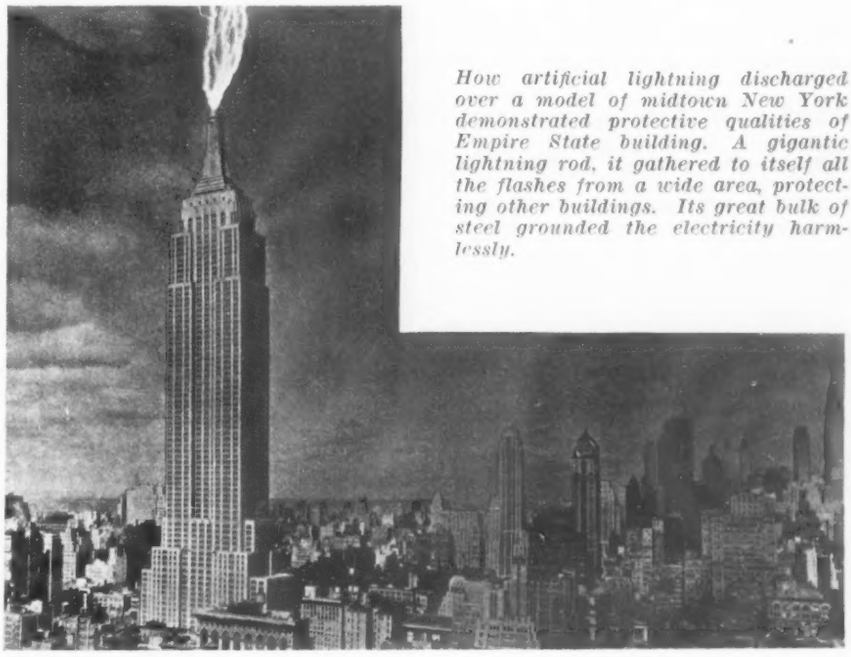
Contracting to furnish and erect structural steel from incomplete plans on a per ton basis is often like the old tragedy of buying a pig in a poke. The New York Structural Steel Board of Trade for several years has opposed this method of closing structural contracts. In a recent announcement sent members, Charles L. Eidlitz, chairman, well illustrated this point.

The steel contractor signed to furnish and erect structural steel for an apartment house, plans for which were still in the sketch stage, at $76.50 per ton. The owner's contract specified that steel details must come from a certain engineering firm which agreed to design the building for a given fee.

Contract with the engineers required the structure should be designed not to take over a certain number of tons. If it took more the engineers would bonus the owner. If it took less, the owner would give the designers a bonus at so much per ton. Naturally the engineers designed the building with the view of winning the bonus. The building was designed and every ton saved under the fixed tonnage meant something like $37.50 for the designer.

But fabricating and erecting costs for the job went up to an "unheard of amount." The steel contractor appealed to arbitration, but his contract with the owner stipulated clearly that he would do the work at so much per ton, according to their design and detail. He lost his case and furnished and erected the steel at a loss also.

Tendency toward light finished metals in buildings will be further carried out in toll houses, toll booths and flood light towers on the George Washington bridge spanning the Hudson river at Fort Washington. All these will be steel frame structures covered with aluminum. Two toll booths will be located east and near Hudson Terrace, two toll houses and seven booths on the plaza east of Lemoine avenue. Four flood light towers will be steel covered with aluminum, 115 feet high, with granite base. Windows will also be constructed with aluminum frames.



How artificial lightning discharged over a model of midtown New York demonstrated protective qualities of Empire State building. A gigantic lightning rod, it gathered to itself all the flashes from a wide area, protecting other buildings. Its great bulk of steel grounded the electricity harmlessly.

EDITORIAL

First-Half Record Shows Higher Level Than 1921

FORGETTING the record year 1929 in steel production, was the first half of 1931 as bad as has been painted, as sorry as loose comparisons with other periods of depression make it out?

When production is below 50 per cent of capacity, as it averaged through the past six months, conditions are undeniably discouraging, but the record for first half of 1931 now is complete and offers a basis of comparison that may serve to show whether we are making long-range progress in spite of the present setback.

A look back to 1921, the previous comparable period of depression, reveals that we are now turning out something like twice as large a tonnage of steel ingots as a decade ago.

During the first half of 1921, total production of bessemer and open-hearth steel ingots was 6,918,884 gross tons; for first half of 1931 it was 15,258,519 tons.

In pig iron the comparative figures are 11,098,122 tons in 1931 and 9,411,011 tons in 1921. The relatively greater output of ingots over the ten-year interval is due largely to the increased use of scrap in making steel.

In 1921 the low month in production of pig iron was July, with 27,892 tons, seasonal factors being superimposed on the depressed condition. By comparison, June, 1931, gave production of 54,599 tons, double that of July ten years ago.

Per Capita Production Also Shows Gain on Basis of Larger Population

An interesting feature arises from the fact that at the close of June in 1921, 74 stacks were active out of 436 available, or 17 per cent. At the close of last month 91 stacks were active out of 303 available, or 30 per cent.

In steel ingots, the low month in 1921 also was in July, with 36,713 tons, while June, 1931, produced 79,843 tons, again double the tonnage of ten years ago.

On the basis of per capita production, the output for 1921 figured 409 pounds of steel and 344 pounds of pig iron for each inhabitant of the United States, in a population of 108,445,000. In the first half of 1931, the per capita production was 495 pounds of steel and 390 pounds of pig iron for each individual, on a basis of 123,000,000 persons, the census total for 1930 being 122,775,000 persons.

One factor in the present depression differs from the condition existing ten years ago. At that time heavy stocks of pig iron, semifinished and finished steel and manufactured articles were in existence, requiring liquidation, and forming a heavy burden against production. Manufacturers did not buy from steel mills because they had a supply of raw materials, and there was no demand for their output until goods already completed had been absorbed. Consumption, therefore, was not represented by the volume of production.

Present Tonnage Going Direct to Use As No Surplus Overhangs Market

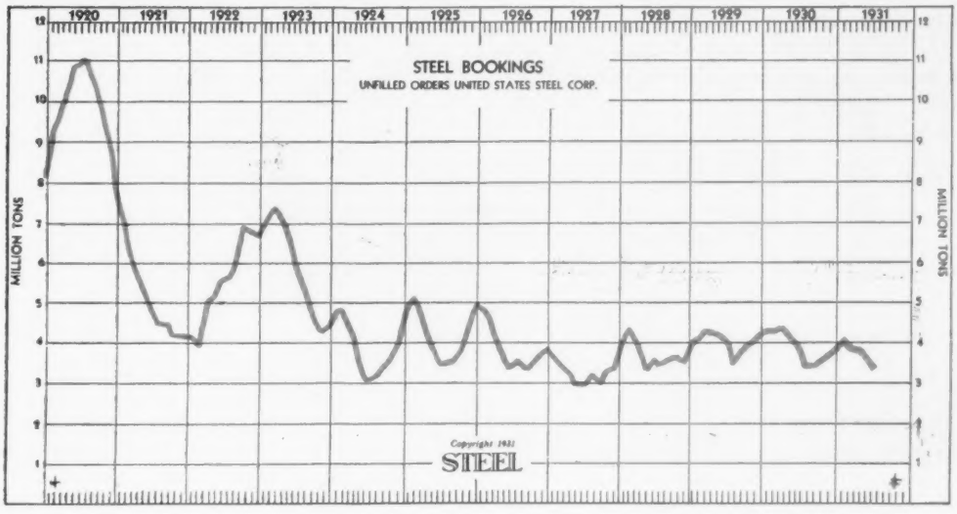
In the present instance, hand-to-mouth buying had been going on for so long that no one has stocks and shelves have been largely bare of manufactured articles and shops of raw materials. What has been bought from steel mills and other suppliers has been in direct response to demand from consumers of the completed article, passed along the line to the source. Volume of buying thus has represented closely the actual consumption, and at all times the situation has been ready for an upturn so soon as buying of manufactured articles should start. There is no supply to act as a buffer and take up the slack.

On the basis of the figures for the first six months of 1931, compared with the similar period of 1921, growth is shown in every factor. Severe as the depression undeniably is, the bottom still is above the depths reached a decade ago and the country is taking more tonnage of iron and of steel than at the earlier period.

That figures for 1931 will not reach the low mark of 1921 seems assured by the wide margin yet remaining between those of June this year and July, the low point ten years ago. Apparently whatever further decline in tonnage may come in the present month will not be sufficient to reach the bottom of the former slump.

Every swing of the pendulum of business has elements of similarity with all others and also points of dissimilarity, so that comparisons by parallel are not easy. New factors appear, to discount the value of predictions based on previous performance. Yet sufficient common factors have appeared in the present instance, compared with other valleys, to warrant the belief that the only direction of movement will be upward from the present level.

THE BUSINESS TREND



1930	
June	3,968
May	4,059
April	4,354
March	4,570
Feb.	4,479
Jan.	4,469

1931	
June	3,479
May	3,620
April	3,897
March	3,995
Feb.	3,965
Jan.	4,132

Foreign Situation Clouds Business Outlook

INTERNATIONAL aspects of the business situation again arise to confuse the outlook. Germany's financial position has reached the acute stage and the manner in which that country and other countries meet the crisis will affect business in many parts of the world. Collapse, with attendant political chaos, undoubtedly would give business sentiment a terrific jolt. On the other hand, intervention by powerful nations along lines which would avert a crash, would stimulate confidence. At best, the situation is delicate.

At home the outlook in commodity prices is not as promising as it was a week or 10 days ago. Most of the commodity indices showed gains in the latter part of June and early in July. Within the week, however, copper, cotton and wheat have weakened considerably. STEEL's composites of iron and steel prices and of finished steel prices remained unchanged last week, but the composite of steelworks scrap rose again for the second consecutive week.

Price Recovery Trailed Business Pick-up By Seven Months in 1921-1922

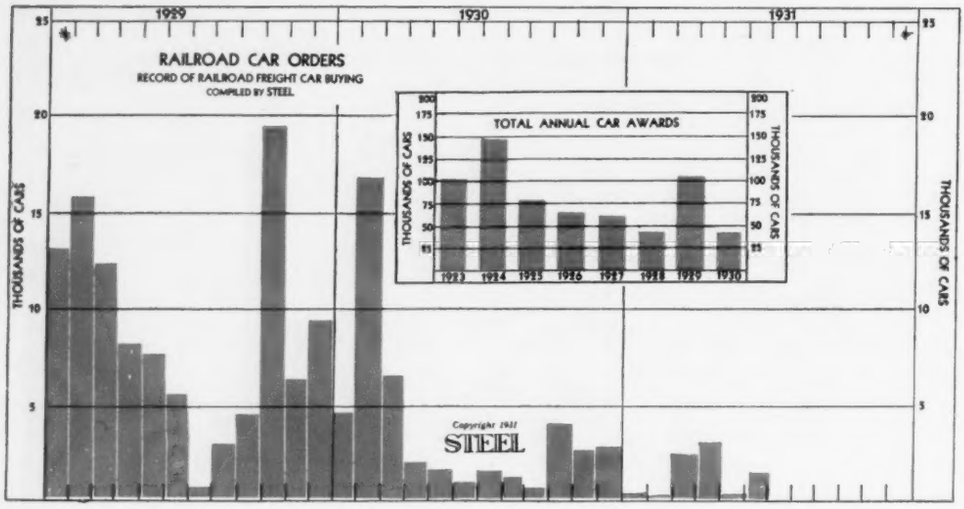
While it is generally agreed that stronger prices at this time would be beneficial in stimulating purchases, it should be remembered that rising prices do not always precede increases in demand. For instance, in the last serious depression the low point in steel ingot output was in July, 1921. Production turned the corner in August and gained steadily for nearly a year. However, prices continued to sag and it was not until March, 1922, that they began to rise. In other words, the turn in prices lagged seven months behind the turn in demand.

Industrial activity is at low ebb, with the steel industry lower relatively than many other industries. This is an unusual situation for steel, for it has enjoyed fair business when other industries were hard hit. The declines in the output of pig iron and steel ingots in June were unusually severe. The present rate of operations—about 33 per cent of ingot capacity—is indicative of the low state of activity.

Automobile Output Is Helped by Work on Improved Models

The outlook in the automobile industry is fair. In the week ended July 11, production was up to nearly 62,000 units, a slight gain over the previous week due to new models introduced by one maker. Observers believe the last half will compare favorably with the first half. Railroad freight traffic improved slightly in the last week for which figures are available, but the volume is still far under 1930 levels.

Business leaders long ago became resigned to a quiet summer, but most of them have continued to expect a moderate upturn in the fall. Two weeks ago signs of improvement seemed to be apparent but now the German crisis and doubt about commodity prices cast a cloud of suspicion over the outlook. Basically conditions at home have not changed, but domestic sentiment is susceptible to influence from the international situation, and therein lies the key to promise or discouragement.



	1931	1930
June	1,910	998
May	20	1,392
April	2,798	1,997
March	2,166	6,118
February	50	17,027
January	100	5,072

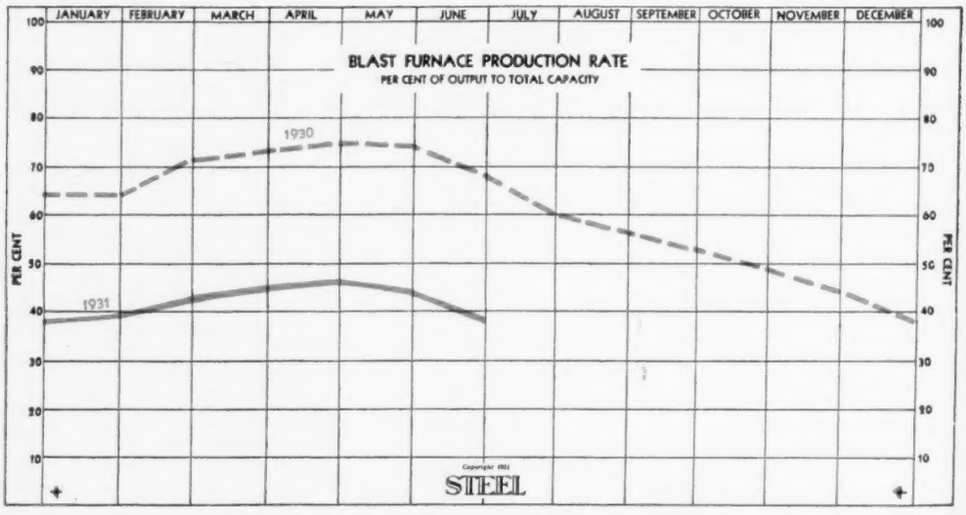
	1930	1929
December	2,729	9,710

Freight Car Bookings Stage Recovery; Six-month Total is Subnormal

Freight car builders received orders for 1910 cars in June. Compared with 2166 in March and 2798 in April, bookings were at the third best total of the present year to date. Placements were far above the negligible orders of May. With the exception of a year ago, when orders dipped below 1000, last month's was the smallest June total since 1925. For the first six months of the present year, aggregate awards were 7044, compared with 32,604 in the initial half of 1930. In 1921, the last year in which the half-year total was lower, 5400 cars were placed in the period. In the first half of the following year orders bounded upward to 100,-350 units.

Blast Furnaces Reduced to 91 as Operations Slip Downward Again

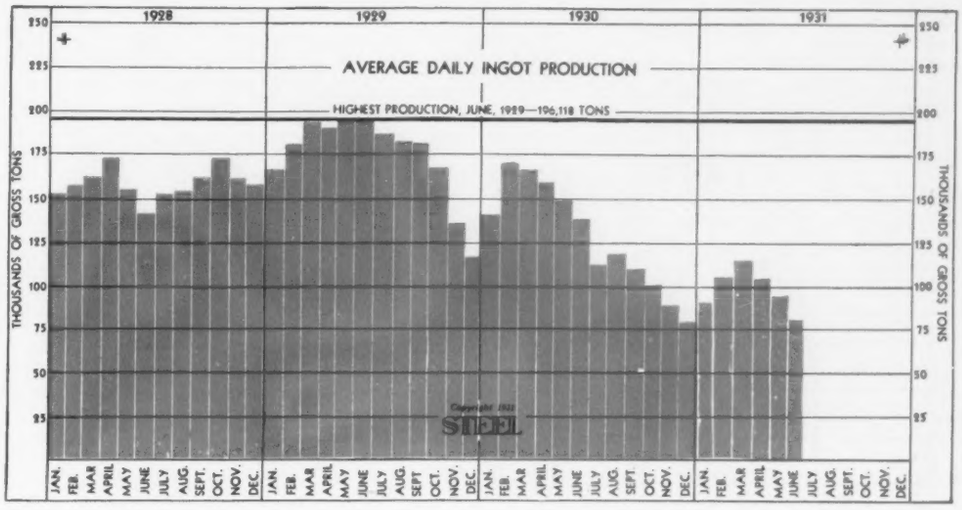
With an operating rate amounting to 37.9 per cent, and with a net loss of 14 furnaces from the active list, pig iron production in this respect dipped in June below the rate of last December, when operations were 38.1 per cent. Furnaces in blast on June 30 numbered 91, with the removal of two merchant furnaces and addition of the same number, and the banking of 15 non-merchant stacks while one was being blown in. The number of potential furnaces has been reduced four to a total of 303. In January, 1922, when daily output was comparable to that of last month, there were 123 in blast at the beginning and 127 were in blast at the end of the month.



Per Cent

	1931	1930
June	37.9	69.3
May	44.7	74.2
April	46.5	75.4
March	45.4	74.5
Feb.	42.5	72.1
Jan.	38.4	65.0

	1930	1929
Dec.	38.1	65.5



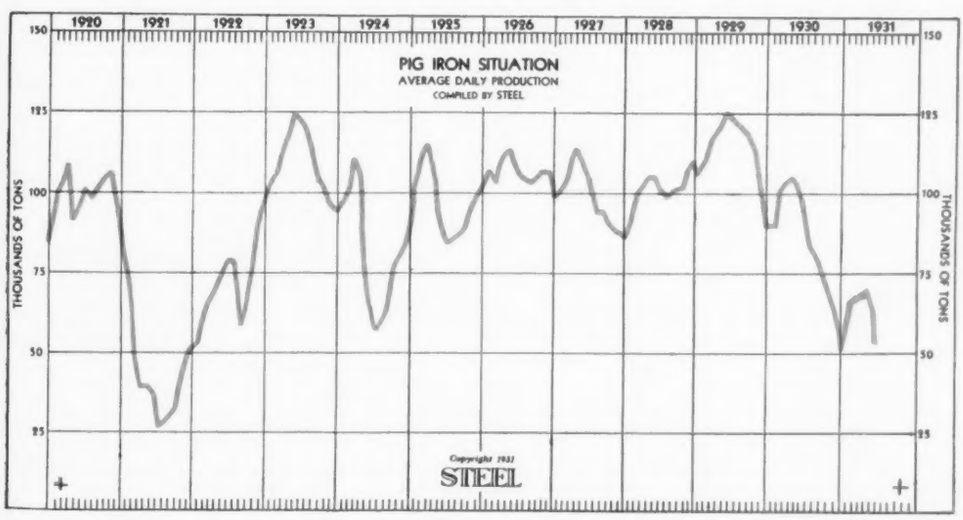
	1931	1930
		Tons
June	79,843	136,741
May	96,365	147,515
April	104,711	158,057
March	115,138	163,628
Feb.	104,265	168,130
Jan.	91,063	139,935

Daily Rate of Ingot Production Takes Drop of 17 Per Cent

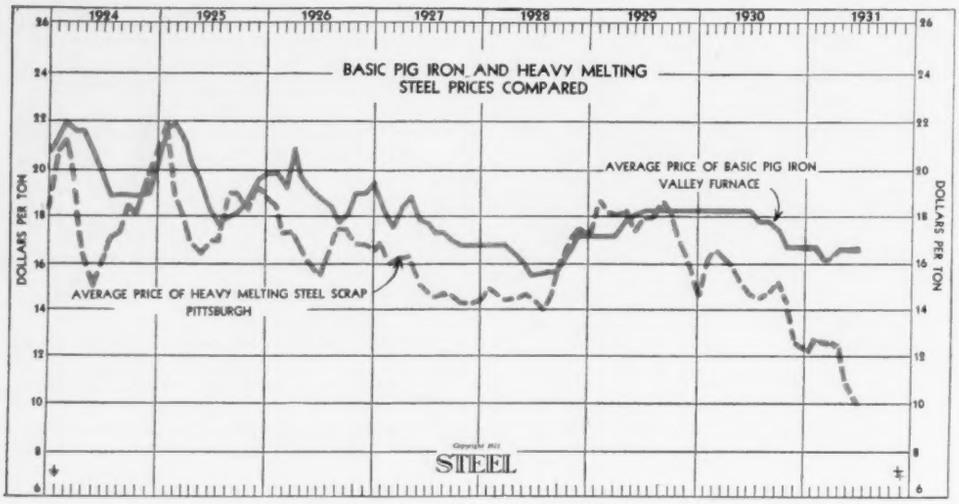
Foreshadowed by the weekly reports of declining activity in operations, the June average daily output of steel ingots dropped to 79,843 gross tons. Not since last December has the daily rate been lower, and excepting that month, June's production was the lowest since July, 1924. Compared with the May rate of 96,365 tons, last month's figure was down 17 per cent, which was the largest proportionate decline since restriction of tonnage began in 1929. Operations were at 37.58 per cent, compared with 68.30 a year ago. Production of ingots in the first half of 1931 amounted to slightly over 15 million tons, compared with more than 23½ million tons in the corresponding period a year ago.

Pig Iron Output for First Half Only 60 Per Cent of 1930 Figure

While a decline in pig iron production in June is a seasonal reaction, the cut in output last month, bringing the daily rate to 54,599 tons, was more than seasonally sharp at 15.2 per cent. Not since the recovery of operations in 1922 has June shown a gain over May, and, excepting last December, not since the first month of that year has production dipped to so low a level. With slackness prevailing even in the spring rise, the total production for the first half of the year amounted to only 11,098,122 tons, compared with 18,304,614 tons in the first six months of 1930, this year's aggregate for the first half being only 60.5 per cent of that for the initial half of 1930.



	1931	1930
		Tons
June	54,599	97,817
May	64,355	104,564
April	66,986	106,371
March	65,448	104,930
Feb.	61,114	114,942
Jan.	55,337	91,573



Basic Pig Iron

	1931	1930
June	$17.00	$18.50
May	17.00	18.50
April	17.00	18.50
March	16.75	18.50

Heavy Melting Steel

	1931	1930
June	$10.30	$15.10
May	11.25	15.40
April	12.50	16.05
March	12.90	16.60

Monthly Average of Scrap Barometer Touches New Low in June

Establishing a new low monthly average, heavy melting steel at Pittsburgh in June further widened the spread between its own price and that of basic pig iron, valley furnace. While the pig iron quotations remained at $17 for the third month, the scrap average broke from $11.25 to $10.30. In setting a new low monthly record, the June average fell below $11.30 of September, 1921; $10.75 of July, 1904, and more particularly, the previous record of $10.40 established in November, 1914. The declines in scrap prices in June were not limited to the Pittsburgh district nor to heavy melting steel, but early in July recognizable firmness was reported as a reaction from last month's lows.

STEEL's Price Composite Holds Steady After First Gain Since March

The first week in July witnessed no change in STEEL's iron and steel price composite from the quotation of $31.11, established the week before. The index in June, beginning with a drop of 30 cents due to lower prices for iron, black sheets, wire and semifinished steel, held steady until the final week, when weakness in galvanized sheets brought a new low at $30.99. With the turn of the month and the half year, new sheet quotations raised the index to the present figure. The rise was the first since March 18. The June average, $31.02, compares with $31.37 in May and $33.53 a year ago. It is the lowest monthly average since November, 1915, when the composite was $28.64.

Weekly Figures

July 8	$31.11
July 1	31.11
June 24	30.99
June 17	31.03
June 10	31.03
June 3	31.03

Monthly Averages

June	$31.02
May	31.37
April	31.59
March	31.66

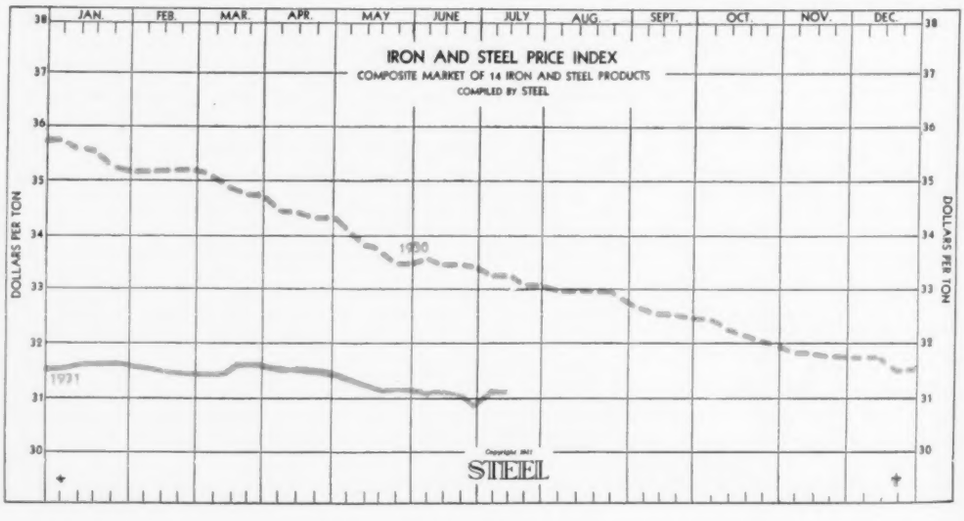


Fig. 1—Cutting an I-beam into structural brackets by gas torch to determine heat distribution in the brackets

Determines Heat Distribution in Torch-Cut Structural Steel

BY R. L. GERUSO
and
T. N. HANNANT

STEEL, whenever heated within the vicinity of 300 degrees Cent. or 572 degrees Fahr., becomes somewhat brittle, the degree of brittleness depending entirely upon the class of steel and its previous history. This is a generally known fact. Because of this fact, it has been mentioned frequently that when structural parts are either welded or shaped by oxyacetylene torches they become brittle unless the affected portions are annealed.

The temperatures attained in oxyacetylene cutting often have been merely a matter of conjecture and for this reason the investigation described in this article was performed in order to record definitely the temperatures attained in shaping a structural bracket in the usual commercial manner. Brittleness in structural sections may be caused by factors other than merely heating to 300 degrees Cent. or 572 degrees Fahr. If, for instance, in unequal heating, the difference in temperature $t_2—t_1$, between the various portions of a member is caused suddenly rather than gradually, violent heat stresses appear which may cause vigorous dynamic stresses in structures intended only for static ones.

Under such conditions, the elastic limit of the material is exceeded, which under certain conditions may cause failure. This feature appears to intensify brittleness and these two combined effects tend to accelerate failure in rigid members. Nonhomogeneity of structure also is another important consideration. Moreover, it is obvious that to determine the distribution in structural brackets, shaped under typical shop conditions, is of great importance not only to the layman as a matter of scientific interest, but also to the shop-

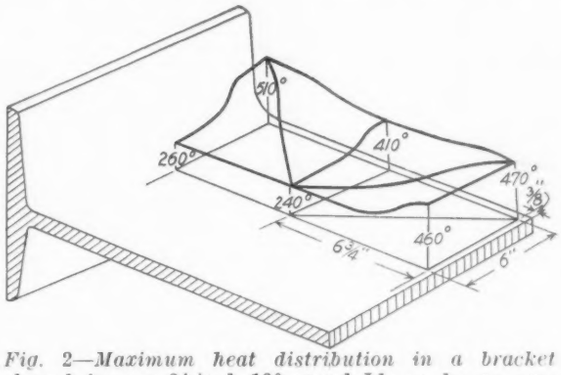


Fig. 2—Maximum heat distribution in a bracket shaped from a 24-inch 120-pound I-beam by an oxyacetylene torch

man as matter of knowledge. The fabricator especially must recognize the limitation of his shaping methods or else injury to the finished product may result.

In the investigation, 24-inch 120-pound I-beams were employed as specimens which were shaped into structural brackets by an expert oxyacetylene cutter in the customary manner. Careful consideration was given to record accurately the temperatures and it was found from numerous preliminary experiments that the insertion of calibrated iron-constantin thermocouples into drilled holes 1/16-inch in diameter at 15-degree angles for a depth of 3/16-inch into the surfaces of the I-beams gave positive contact and accurate results. Good contact was further assured by filling the contact holes with a plastic alloy of mercury-tin-silver. The couples were protected from the oxyacetylene flame by asbestos sleeving and pads.

Curves Determined

Two of the temperature-time curves are shown in Fig. 3. Only two curves are shown because they are typical of many obtained in the progress of the investigation. The sketch in the upper corner of Fig. 3 illustrates the method of cutting the 3-foot 24-inch 120-pound I-beam.

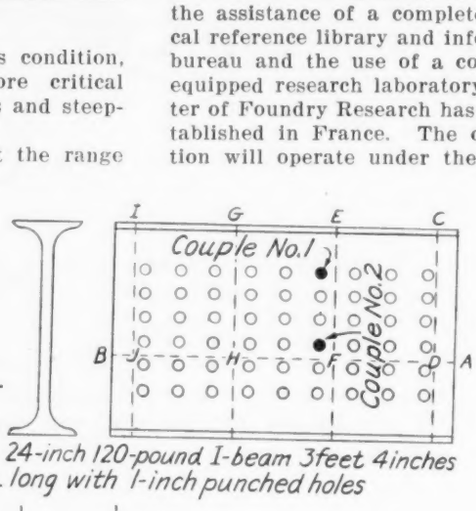
A 6-foot 24-inch 120-pound I-beam likewise was cut into structural sections as shown in Fig. 1 and from the numerous temperature-time curves obtained Fig. 2 was constructed to show the heat distribution in a bracket while being shaped by an oxyacetylene torch. All the curves show that the temperature gradient from the point of cutting is exceptionally steep, which fact is favorable to the introduction of severe heat stresses. This condition, of course, becomes more critical with higher temperatures and steeper gradients.

Fig. 2 points out that the range of temperature attained is from room to 510 degrees Fahr. with the highest temperature being recorded near the fillet which in structural parts is a critical section. Although the temperatures attained in shaping other brackets will fluctuate, depending upon the mass of steel and manner of cutting, the highest temperatures will undoubtedly be recorded near the cutting edges and fillet.

Annealing is the best method for relieving severe heat stresses in structural parts, but in the majority of cases this is impractical commercially. If, however, the member is heated somewhat so that t_1 of the temperature difference $t_2—t_1$; is raised, then the gradient becomes smoother and only mild heat stresses below those required for safety are generated. This feature is either knowingly or unknowingly employed by most expert oxyacetylene cutters when they run their preheating flame over the line of cut.

WITH steel becoming brittle when heated to approximately 572 degrees Fahr., the question "What happens to structural steel when cut or welded by the oxyacetylene torch?" frequently arises. Subsequent annealing, of course, will eliminate brittleness, but this usually is not practicable in the field. In seeking the answer to this question, an extensive series of tests, as described in the accompanying article, was conducted. Results indicated that temperatures do not exceed 510 degrees. Moreover, only mild heat stresses below those required for safety are generated when the preheating flame is run over the line of cut.

Sketch showing method of cutting I-beam and location of thermocouples



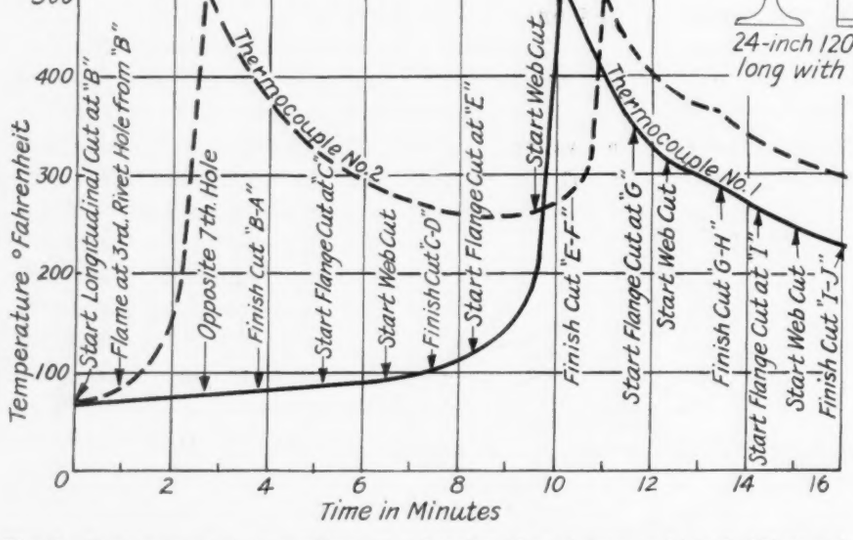


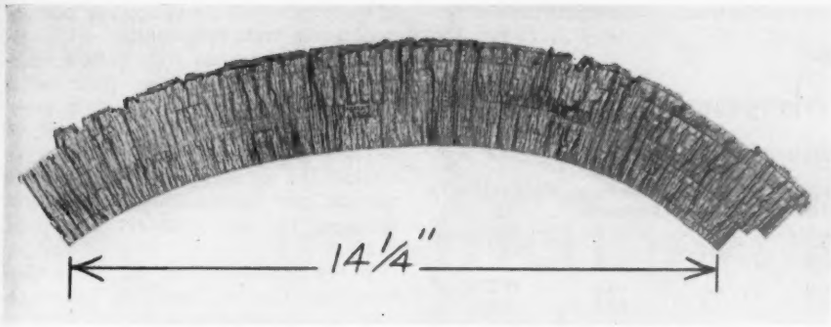
Fig. 3—Temperature-time gradient of a bracket shaped from a 24-inch 120-pound I-beam by an oxyacetylene torch. Web and longitudinal cuts were made at a rate of 1.06 feet per minute. The cross cut, flange and web cuts were completed in 2 minutes and 16 seconds

Foundry Research Center Is Established in France

To offer to consumers of cast iron the assistance of a complete technical reference library and information bureau and the use of a completely equipped research laboratory, a Center of Foundry Research has been established in France. The organization will operate under the general direction of Leon Guillet, director of the Ecole Centrale des Arts et Manufactures, France's leading engineering school.

Operation of the research center will be supervised by August Le Thomas, well known for his studies of cast iron, foundry practice and metallography. He will be assisted by a staff of experienced engineers.

The library and information bureau are located at 18, Rue La Boetie, Paris. Research work will be carried out in the laboratories of the Hauts Fourneaux de Saulnes at Saulnes. Although the latter is a pig iron producing interest, activities of the company and the research organization will be independent.



Turning taken from a zirconium-treated steel casting

Zirconium Additions Improve Steel and Cast Iron

CONSIDERABLE interest has been aroused over the use of zirconium in steel and cast iron and its effects upon the properties of castings. Recent tests indicate that small additions of zirconium to castings greatly improve resistance to impact and hydrostatic pressure, and also increase the strength and deflection of the metal to some extent. Furthermore, there is a decided refinement of the grain structure resulting from the deoxidizing and denitrogenizing action of this element.

Impact tests on two plain-carbon steels treated with zirconium show a marked improvement over two steels of similar analysis but in the untreated forms. One of the heats, analyzing 0.61 per cent carbon, 0.23 per cent silicon, 0.62 per cent manganese, 0.015 per cent phosphorus, and 0.019 per cent sulphur, and cleansed with ordinary ferrosilicon showed an Izod value of 12.0. This same steel, purified with zirconium-ferrosilicon showed an Izod value of 15.2, or an improvement of 26.7 per cent due to the addition of zirconium. Another steel, low in carbon and high in phosphorus and sulphur was analyzed as follows: 0.16 per cent carbon, 0.23 per cent silicon, 0.65 per cent manganese, 0.146 per cent phosphorus, and 0.047 per cent sulphur. Using ferrosilicon, the Izod values were 35.3 as against 46.0 with zirconium-ferrosilicon, or an improvement of 30.4 per cent when zirconium was added.

Several tests have been made of the physical properties of pearlitic manganese steels both with and without zirconium additions and with different methods of heat treatment. The studies covered three different steels, each having a different carbon and manganese content. Table 1 shows the results obtained from these investigations.

As may be noted from this table, those heats receiving heat treatment "A" merely were normalized and allowed to cool from 1560 degrees Fahr. Treatment "B" consisted of the usual quenching practice followed by drawing from slightly below the critical range. Treatments "C" and "D" were similar to "B," but the initial quenching operation was carried on from a higher temperature, while the drawing was done from lower temperatures and for a longer period of time.

Properties Are Improved

The results of these tests prove rathconclusively that the addition of small amounts of zirconium to this type of steel is beneficial in increasing the ductility and resistance to impact, and raising the elastic ratio of the metal. Table II shows the improvement resulting from zirconium treatment of the steels listed under Table I.

From the tabulation in Table II it will be noted that the properties are almost uniformly improved by the zirconium treatment. In a few instances one property, such as reduction of area, is somewhat reduced, but a more than corresponding improvement of the other characteristics offsets this slight decrease.

Table III shows the results of further tests conducted on manganese steel, air cooled from 1500 degrees Fahr., and containing no zirconium, 0.10 per cent zirconium, and 0.20 per cent zirconium. It is interesting to note that slightly better results are obtained in most properties when 0.20 per cent zirconium is added than when 0.10 per cent is used.

It has been found that additions of

Table I

Effect of Zirconium, Carbon and Manganese on Heat-Treated Steel

			No Zirconium					0.10% Zirconium				
Heat number	Carbon %	Manganese, %	Heat treatment	Izod value	Elastic limit, lbs. sq. in.	Ultimate strength, lbs. sq. in.	Reduction of area, %	Elongation %	Izod value	Elastic limit, lbs. sq. in.	Ultimate strength, lbs. sq. in.	Reduction of area, %	Elongation %
409-A	0.52	1.15	A	15.0	58,700	118,500	53	18.5	.....	.....	.....	.....	.....
409-A	0.52	1.15	B	37.1	93,500	131,000	50	10.0	20.8	67,200	116,500	57.0	21.0
409-B	0.52	1.15	A	.....	.....	.....	....	.....	39.8	127,700	141,000	40.0	13.0
409-B	0.52	1.15	B	.....	.....	.....	....	.....	.....	.....	.....	.....	.....
413-A	0.42	1.34	A	25.3	65,000	114,300	48	19.5	.....	.....	.....	.....	.....
413-A	0.42	1.34	B	45.4	128,700	140,000	55	15.0	32.5	69,400	112,400	60.0	22.5
413-B	0.42	1.34	A	.....	.....	.....	....	.....	51.6	117,400	133,400	49.0	15.0
413-B	0.42	1.34	B	.....	.....	.....	....	.....	.....	.....	.....	.....	.....
414-A	0.27	1.50	A	26.6	49,700	101,300	46	20.5	.....	.....	.....	.....	.....
414-A	0.27	1.50	C	43.1	155,650	169,900	58	10.7	.....	.....	.....	.....	.....
414-A	0.27	1.50	D	61.5	126,650	136,650	62	14.0	46.2	51,400	100,300	56.5	22.5
414-B	0.27	1.50	A	.....	.....	.....	....	.....	45.0	156,550	167,400	56.0	12.2
414-B	0.27	1.50	C	.....	.....	.....	....	.....	67.7	121,650	131,200	63.0	16.5
414-B	0.27	1.50	D	.....	.....	.....	....	.....					

Heat Treatments:
A—Air cool from 1560 degrees Fahr.
B—Oil quench from 1500 degrees Fahr. (ordinary) and 1 hour at 1000 degrees Fahr.
C—Quenched from 1560 degrees Fahr. into oil at 525 degrees Fahr. for two hours, two hours at 752 degrees Fahr.
D—Quenched from 1560 degrees Fahr. into oil at 525 degrees Fahr. for two hours, two hours at 842 degrees Fahr.

Table II

Percentage Improvement of Manganese Steel with 0.10 Per Cent Zirconium Addition

Heat number	Carbon, %	Manganese, %	Heat treatment	Izod value	Elastic ratio	Reduction of area, %	Elongation, %
409	0.52	1.15	A	38.7	17.4	7.5	13.3
409	0.52	1.15	B	7.2	26.7	—20.0	30.0
413	0.42	1.34	A	28.2	9.0	25.0	15.2
413	0.42	1.34	B	18.8	—3.7	—10.8	0.0
414	0.27	1.50	A	73.5	4.4	22.9	9.7
414	0.27	1.50	C	4.3	2.1	—3.4	14.0
414	0.27	1.50	D	10.0	0.0	1.7	17.8

Heat Treatments
A—Air cool from 1560 degrees Fahr.
B—Oil quench from 1500 degrees Fahr. (ordinary) and 1 hour at 1000 degrees Fahr.
C—Quenched from 1560 degrees Fahr. into oil at 525 degrees Fahr. for 2 hours, 2 hours at 752 degrees Fahr.
D—Quenched from 1560 degrees Fahr. into oil at 525 degrees Fahr. for 2 hours, 2 hours at 842 degrees Fahr.

zirconium to cast iron have as beneficial effect upon the metal as do similar additions of the alloy to steel. According to the late Dr. Moldenke, by far the most important effect is the refining action of zirconium on the structure to which he refers as the "closing up of the grain" of the cast iron. The many important improvements of the physical properties are a result of this refining action.

In a series of careful studies of the effects of various silicon alloy additions to cast iron, it was found that the addition of 0.25 per cent zirconium in the form of silicon-zirconium, containing 35 per cent zirconium, 45 per cent silicon, and 20 per cent iron, brought a remarkable change. The material treated in this manner presented a peculiar dark gray, velvety fracture indicative of great toughness. Subsequent impact tests proved this increase in toughness.

A further advantage derived from the use of zirconium is the increased resistance to hydrostatic pressure. An addition of 0.16 per cent zirconium as zirconium-manganese-silicon (58 to 62 per cent silicon, 10 to 12 per cent manganese, 20 to 24 per cent zirconium) greatly improves the hydrostatic pressure resistant properties of ordinary foundry iron. Whereas 800 pounds per square inch is considered unusually high for the maximum strength of a 12-inch gate valve casting, 900 pounds per square inch was attained with zirconium-treated cast iron before leakage occurred. In further tests on 8-inch globe valves, the ultimate pressure on a treated valve was found to be 2300 pounds per square inch, as against the usual figure of 1700 to 2000 pounds per square inch to produce leakage in an ordinary cast-iron valve.

In tests conducted at the Union Carbide and Carbon Research Laboratories, it was found that the addition of silicon-zirconium to a white-iron base effectively grayed the iron with resulting high-tensile and transverse strengths.

Substitute Can Be Used

As a result of the physical, chemical, and photomicrographic studies of zirconium-treated steel and cast iron, several interesting conclusions have been reached. Silicon-zirconium alloys may be used to advantage in acid steel castings which normally have a final silicon content of 0.30 to 0.40 per cent. By substituting zirconium-ferrosilicon for 50 per cent ferrosilicon to meet the final silicon specifications, there will be an addition of one-third as much zirconium, or 0.10 to 0.13 per cent. This percentage of zirconium acts as a deoxidizer and denitrogenizer, and as a fluxing agent, increasing the tendency of the dissolved impurities to rise from the metal into the slag.

Analyses of the final steel show one-half or one-quarter of the nitrogen content in the treated steel as compared to that found in ordinary castings. Microscopic examination of zirconium-treated steel reveals a distribution of

Table III

Effect of Zirconium on Manganese Steel, Air Cooled from 1500 Degrees Fahr.

	A — No Zirconium							B — 0.10% Zirconium					C — 0.20% Zirconium				
Heat number	Carbon, %	Manganese, %	Impact value	Elastic limit in 1000 lbs./sq. in.	Ultimate strength, in 1000 lbs./sq. in.	Reduction of area, %	Elongation, %	Impact value	Elastic limit, in 1000 lbs./sq in.	Ultimate stgth., in 1000 lbs./sq. in.	Reduction of area, %	Elongation, %	Impact value	Elastic limit, in 1000 lbs./sq. in.	Ultimate stgth., in 1000 lbs./sq. in.	Reduction of area, %	Elongation, %
408A	0.41	1.52	18.8	61.4	117.0	45.6	17.0										
B								32.6	62.9	112.3	59.6	21.5					
C													34.0	61.1	110.2	57.5	20.5
411A	0.29	1.22	43.4*	57.8	92.3	63.8	27.0										
B								77.3	61.7	91.8	57.9	26.5					
C													78.0*	62.2	90.0	68.2	28.2
412A	0.24	1.61	33.0	48.8	95.4	56.4	24.0										
B								47.4	46.1	95.1	56.8	25.5					
C													55.8*	46.2	92.6	58.6	25.7
413A	0.42	1.34	25.3	65.0	114.3	47.7	19.5										
B								32.5	69.4	112.4	59.8	22.5					
C													22.8	62.7	114.8	62.5	20.5
414A	0.27	1.50	26.6	49.7	101.3	46.4	20.5										
B								46.2	51.4	100.3	56.5	22.5					
C													65.7*	54.6	93.8	63.1	24.5
417A	0.29	1.32	26.4	54.6	100.2	54.5	23.0										
B								41.2	53.8	98.5	55.4	23.5					
C													42.9*	54.7	97.8	57.7	23.6
423A	0.39	1.22	32.4	62.4	102.2	59.9	23.0										
B								45.4	59.7	99.8	61.8	25.5					
C													38.8	61.0	100.0	60.5	23.0
Percentage improvement by zirconium								56.8	1.4	—1.6	9.0	8.6	64.0	0.7	3.2	14.8	7.7

Why TIMKEN is the steel industry's most efficient anti-friction bearing

The modern designing engineer selects anti-friction bearings mainly on the basis of these three essentials—friction elimination, load carrying capacity, precision. Hence, the steel industry's overwhelming preference for Timkens for its toughest jobs in mill roll necks, mill drives, hot saws, transfer and run-out tables, mill motors, overhead traveling cranes and all other equipment. It will pay you, over and over, to specify Timken Bearing Equipped.

FRICTION ELIMINATION

The Timken Tapered Roller Bearing is practically free from all friction, due to (a) tapered rolls operating between tapered raceways, a basic principle originated and developed by Timken; (b) precision machining of the tapered rolls and raceways; (c) positive alignment of rolls under all loads and at all speeds; (d) spacing of the rolls by a scientifically designed cage... Roll spacing is an important fundamental. There is a limit to the number of rolls that can be used in a bearing of any given size without incurring a severe friction penalty. Positive roll alignment through end contact of the rolls with the cone rib, is a basic feature of the Timken Bearing. The cage is only used to space the rolls.

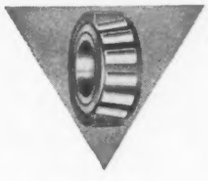
LOAD CARRYING CAPACITY

The Timken Bearing carries all radial, thrust and combined loads equally well, due to Timken tapered construction. Size for size, Timkens can carry maximum loads because (a) the loads are carried on the entire length of the tapered rolls, cone and cup; (b) the largest possible number of rolls permissible with full anti-friction efficiency is used; (c) the material employed is Timken-made alloy steel developed and produced exclusively for the purpose. Timken Bearings are carrying loads up to 8 million pounds in steel mills.

ACCURACY and PRECISION

The Timken Bearing is manufactured to close limits of accuracy under the most thorough and rigid system of inspection and testing that could be devised. Much of the special machinery used was designed and developed by Timken engineers. Timken precision has revolutionized the performance of heavy duty machine tool spindles.

TIMKEN *Tapered Roller* **BEARINGS**



impurities irrespective of the grain boundaries, whereas aluminum-treated alloys usually show segregated impurities at the grain boundaries. This is particularly true of steel made by reducing silicon from the slag.

Zirconium also is valuable in counteracting high-sulphur content. Ordinarily the sulphur in soft steel castings is not sufficiently high to be detrimental, but in the production of acid-resisting castings containing high-chromium and nickel contents, many foundries include returned scrap carburizing boxes containing absorbed sulphur as part of the charge. The use of zirconium, particularly silicon-zirconium, is of great assistance in neutralizing the effect of this sulphur which cannot be eliminated in acid electric-furnace practice. Because of this, the presence of above 0.15 per cent zirconium prevents the hot shortness usually encountered in high-sulphur steels.

Increase Shock Resistance

Practice in some foundries is to use low-carbon, low-manganese steel with high ductility and low tensile strength for railroad castings which are subjected to repeated shocks in service. A higher manganese steel, treated with zirconium, would have the same resistance to shock in addition to the advantage of a high tensile strength. In some cases of heat-treated and rolled steels containing 1.50 per cent manganese, the increase in shock resistance is as much as 50 per cent.

Machinability also is increased through the use of zirconium because the steel has a more uniform texture and is free from hard spots or porous conditions. The illustration on Page 41 represents a turning originally twice this length which was taken from a zirconium-treated steel casting. Such a turning hardly would be possible if some other scavenging agent were used because of the hard, brittle inclusions remaining in the steel.

The test results indicate that zirconium affects cast iron in a manner somewhat similar to that of steel. Greater impact resistance and toughness, and a close-grained structure unusually resistant to hydrostatic pressure are assured. As has been mentioned, there is a marked deoxidizing and denitrogenizing action, and in addition a graphitizing effect on white iron with resulting increase in strength.

In general, the additions of zirconium to cast iron will vary from 0.10 to 0.30 per cent. The element should be added in the form of an alloy such as silicon-zirconium or zirconium-manganese-silicon because these alloys are absorbed more easily by the liquid cast iron than is ferrozirconium. In cupola practice the crushed material may be added to the cupola stream during the filling of the ladle in the same manner as chromium and nickel now are added.

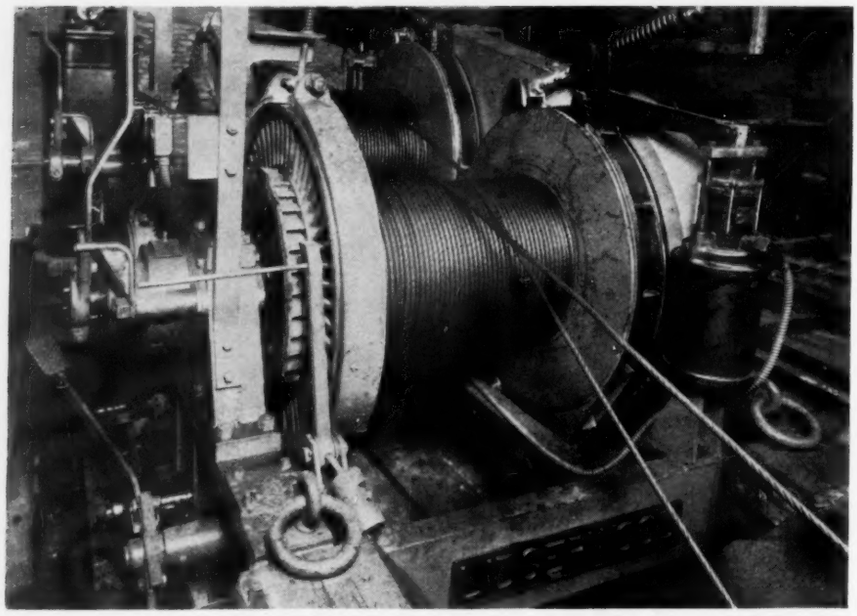
The zirconium alloy addition usually brings in considerable silicon, and it, therefore, is advisable to keep the silicon in the cupola metal correspondingly low when such an alloy is to be added. Otherwise, the increased silicon content under certain conditions weakens the iron and masks the beneficial effect of the zirconium. The alloy addition occasionally makes the metal appear somewhat cold, but fluidity seems to be increased, so that castings will run well, and sculls are not as large as in normal practice.

Zirconium-ferrosilicon, which sometimes is used for steel castings, should be added to the metal in the furnace in all cases except that of basic open-hearth practice. If silicon-zirconium or zirconinum-manganese-silicon is used, it may be added to the stream during the filling of the ladle similar to the customary cast-iron practice.

Various Alloys Described

Zirconium-ferrosilicon contains 12 to 15 per cent zirconium, 40 to 45 per cent iron, and 39 to 43 per cent silicon. Silicon-zirconium contains 35 to 40 per cent zirconium and 47 to 52 per cent silicon. Zirconium-manganese-silicon contains 20 to 24 per cent zirconium, 10 to 12 per cent manganese, and 58 to 62 per cent silicon. An addition of 8 pounds of the latter alloy to every 1000 pounds of metal will give a zirconium content of 0.16 per cent, a value considered suitable for such materials as valve castings.

The results of these tests indicate conclusively that the interest of metallurgists in the effect of zirconium on steel and cast iron is well founded. The beneficial effects resulting from additions of this alloy are sufficiently important to demand further attention throughout the iron and steel industry.



AUXILIARY HOIST BRAKE ELIMINATES DROPPED LOAD DANGER

Closeup view of hoist brake which functions automatically to halt a falling load—a new factor of safety in the erection of structural steel. In operation the electromagnet at right exerts a pressure to keep the brake released, permitting operation of the foot brake at the left; but with the blowing of a fuse, power shut off or falling load, the magnet is de-energized, releasing the spring and applying the brake. The unit was designed by Robert C. McCord, vice president, Post and McCord, steel contractors, New York, and is being manufactured by the Lidgerwood Mfg. Co., Elizabeth, N. J.

Committee To Standardize Foundry Equipment

Organization of a sectional committee on standardization of foundry equipment has just been completed under the procedure of the American Standards association. E. S. Carman, president, Edwin S. Carman Inc., Cleveland, is chairman of the committee, and John J. Baum, development engineer, Steel Founders' Society of America Inc., New York, is secretary.

Work of the committee has been divided between three subcommittees as follows:

Subcommittee 1: Pattern Plates; molding machine parts affecting interchangeability of patterns; flask pins and holes; general dimensions of stock flasks for jobbing work.

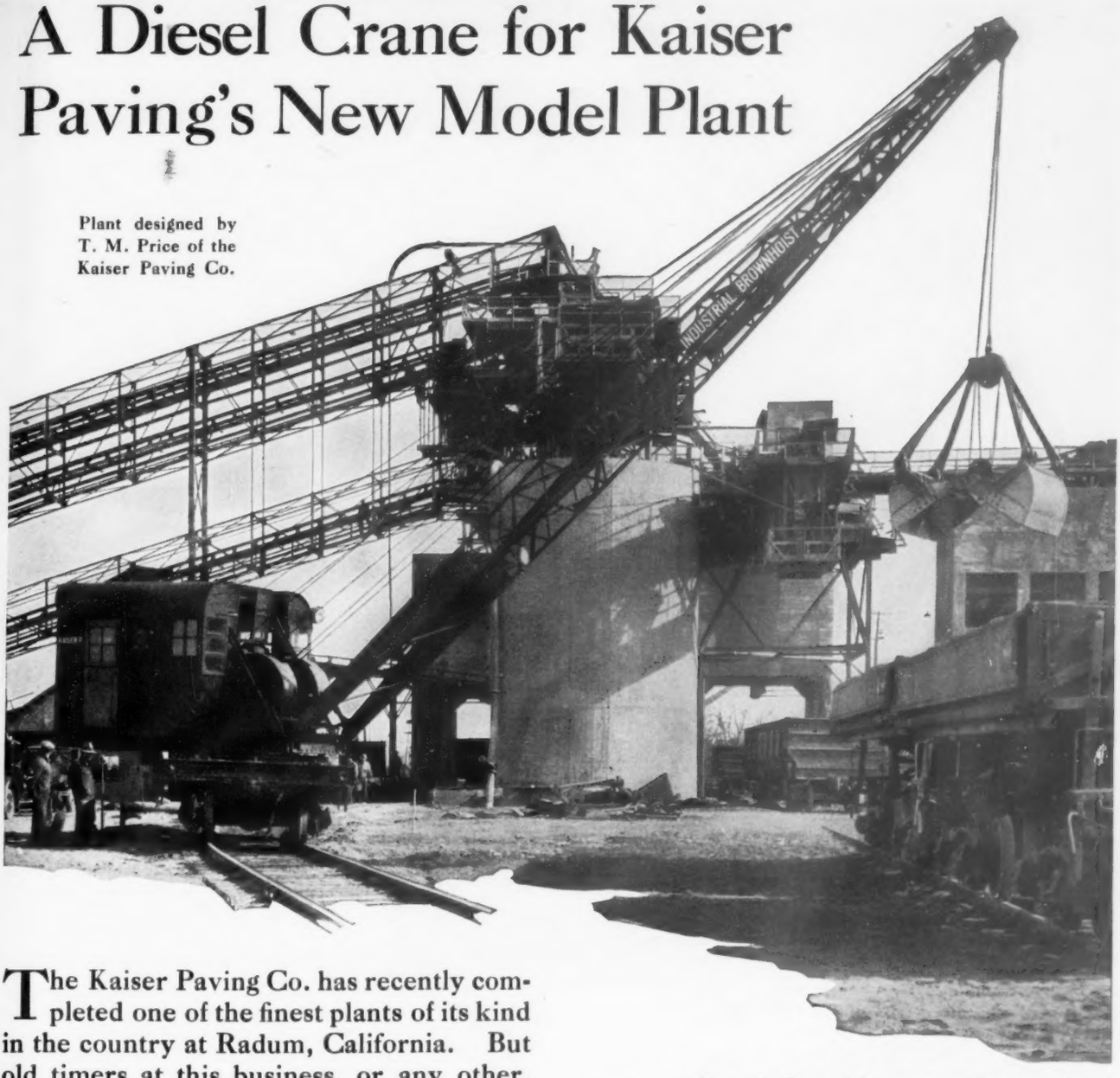
Subcommittee 2: Ladle and ladle shank sizes; ladle sleeves, stoppers and nozzles.

Subcommittee 3: Stock core print sizes, shapes and finish allowances; pattern markings; wrapping plates; fillet sizes; dowel pins for metal pattern sand metal core boxes.

The project is under the joint sponsorship of the American Foundrymen's association and the American Society of Mechanical Engineers.

A Diesel Crane for Kaiser Paving's New Model Plant

Plant designed by T. M. Price of the Kaiser Paving Co.



The Kaiser Paving Co. has recently completed one of the finest plants of its kind in the country at Radum, California. But old timers at this business, or any other, do not build model plants for show—they build them because they know that the best layout and the best equipment make the biggest profits.

The Kaiser people know the performance record of Industrial Brownhoist cranes first-hand because they have used them for many years. Based on this experience, another Industrial Brownhoist—their fourth—was purchased for this new plant. And this time, they chose a Diesel crane.

The name Industrial Brownhoist stands for the most complete line of locomotive cranes ever built, plus a half century's experience in helping industry keep its handling methods in line with production requirements. Sooner or later handling costs must be studied in every plant. Why not let our representative help you with yours now?

Industrial Brownhoist Corporation, General Offices, Cleveland, Ohio

District Offices: New York, Philadelphia, Pittsburgh, Detroit, Chicago, New Orleans, San Francisco, Cleveland.

INDUSTRIAL BROWNHOIST

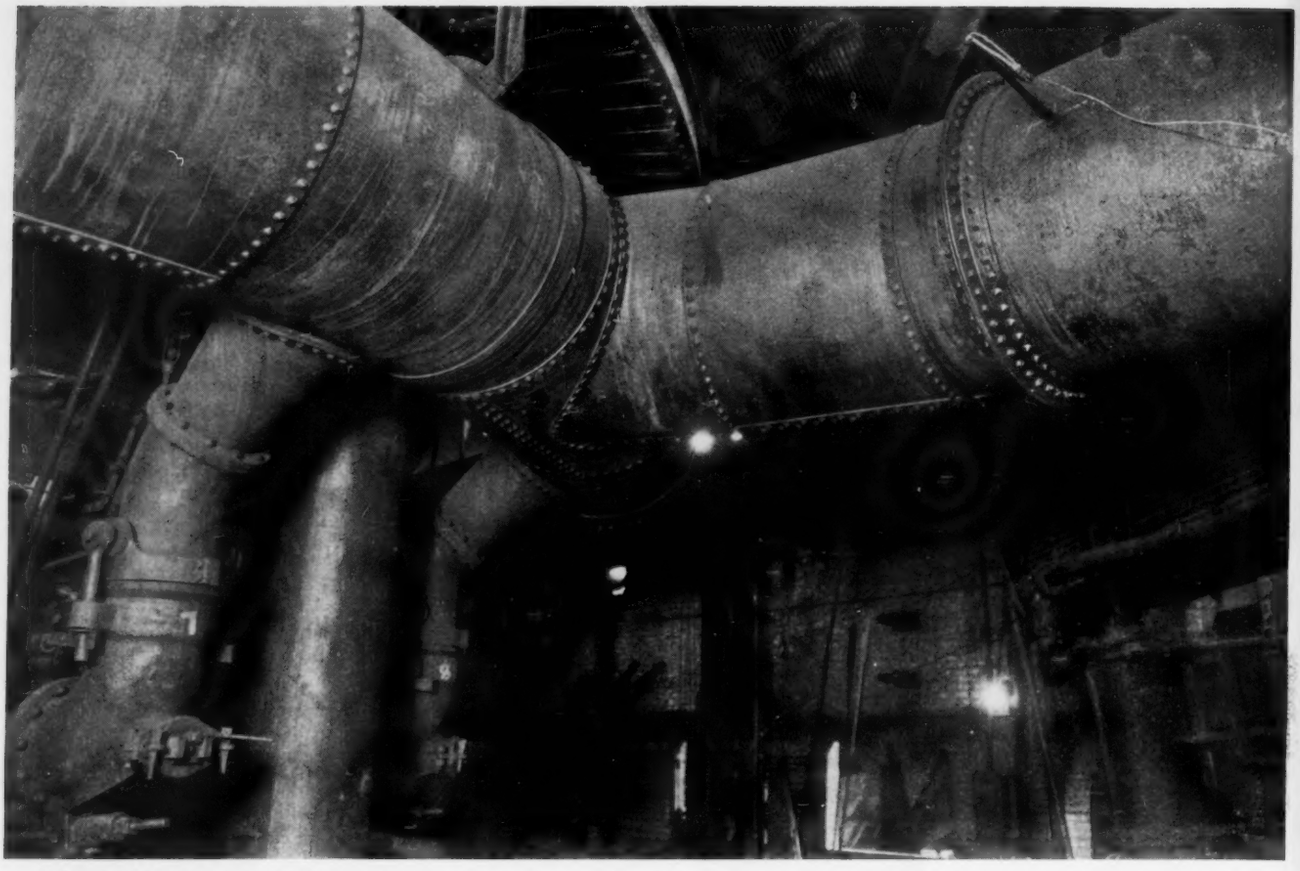


Fig. 1—Hot blast main before it enters the bustle pipe showing the recommended location for the thermocouple

Hot Blast Temperature Is Controlled Automatically

BY H. R. SIMONDS
Associate Editor, STEEL

MODERN blast furnace equipment now definitely includes some form of automatic temperature control. Such a control system not only improves the quality of the furnace products but results in marked savings in operating costs. The development of satisfactory temperature controlling apparatus has not been as simple in the case of the blast furnace as it has been in many other applications. Some of the difficulties to be overcome in controlling the blast furnace may be judged from the fact that the temperature at which it is desirous to maintain the hot blast depends upon the grade of ore, the grade of limestone and coke, the percentage of moisture in the coke and the moisture in the air. The temperature varies also with the sulphur content of the ore.

At the plant of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., a 600-ton furnace uses ore varying from approximately 32 to 36 per cent iron and hot blast varying in temperature between 900 and 1500 degrees Fahr. In the case of a 600-ton furnace of the Bethlehem Steel Co., Bethlehem, Pa., an ore varying approximately between 52 and 56 per cent iron is used and the hot blast temperature is held between 900 and 1200 degrees Fahr. A 1000-ton furnace of the Bethlehem Steel Co. at Sparrows Point, Md. uses a South American ore with a content close to 36 per cent iron and has a blast temperature varying from 1200 to 1400 degrees Fahr.

Another difficulty is the fact that an ordinary blast furnace is served by three or more hot blast stoves which are placed on the system alternately with sudden temperature disturbance at the time one stove is taken off and another put on. The number of stoves on the air at one time varies with different practice, but under normal operations usually only one stove is on the line at a time.

Control Apparatus Developed

The Leeds & Northrup Co., Philadelphia, for many years has been engaged in the development of automatic control apparatus for blast furnaces and a description of its method of control will illustrate some of the basic principles in all blast furnace temperature control. The equipment itself is relatively simple. A thermocouple is set permanently in the hot blast main, usually just before it joins the bustle pipe. The couple is electrically connected with a temperature recorder controller located in a convenient place at some distance from the furnace. This instrument is enclosed in a glass case and in addition to its control feature produces a continuous chart of the hot blast temperature. A section taken from an actual chart is shown in Fig. 2. This chart, as will be noticed, indicates the temperature of the hot blast, the time that stoves are changed and the interval between changes. The control feature of the recorder controller has a separate circuit which, through a system of electrical contacts and relays, operates a motor and gear mechanism which in

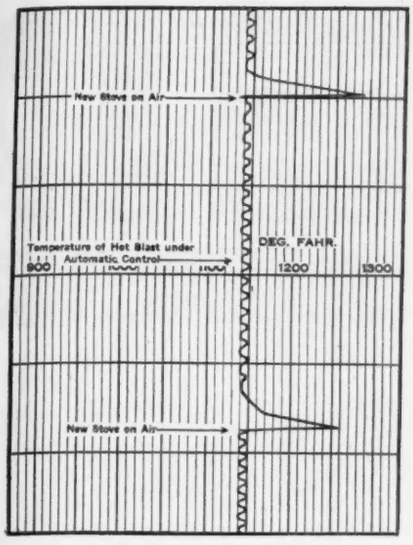


Fig. 2—Reproduction of a chart in the automatic temperature control of a blast furnace

turn controls the mixer valve and other valves as may be required.

When placing a new stove on the furnace it is necessary to open its hot blast valve and close the hot blast valve and then put gas on the stove which has just come off air. These various operations sometimes are performed by electric motors or hydraulically operated valves at predetermined intervals and in proper sequence. Under full automatic control the hot blast for a furnace may be supplied for hours and days continuously without an operator and with the temperature of the blast held accurately within plus or minus 8 degrees Fahr., except at the time new stoves are put on the air, when there are brief quickly corrected variations. The motor-gear unit for driving the mixing valves usually is installed directly on the hot blast line and usually in the immediate vicinity of the valve. Fig. 3 shows the control valve on the hot blast main. This is operated by steel cables which connect with a motor-gear unit located nearby on a convenient and partially-enclosed platform. The gear mechanism is equipped with a declutching device so that the valve can be operated manually.

Regulated by Temperature

As stated, the interval of time between the placing of one stove on the furnace and then another may be governed by temperature. Under normal conditions during the gradual cooling of a stove there is obtained a floating or throttling control on the mixing valve with a progressive mixing action which gradually opens the valve to compensate for reduced stove temperature. However, at the time a new stove is put on the system this inching action is suspended and the valve-opening motor is operated at maximum speed which gives a full opening or full closing of the valve in less than a minute.

In order to reduce the tendency to overshoot in valve control, thus causing surging first to one side and then the other of the temperature control limit, the Leeds & Northrup Co. has devised what is termed an anticipatory controller. A slow movement of the valve is secured upon the initial temperature departure from normal. When this slow valve movement is insufficient to stop the temperature trend and the temperature falls lower, the valve operates at four times normal speed to check the temperature until it again returns within a certain control band. Here it is stopped by the anticipator action and overshooting is reduced to a minimum.

The operation of the valve control

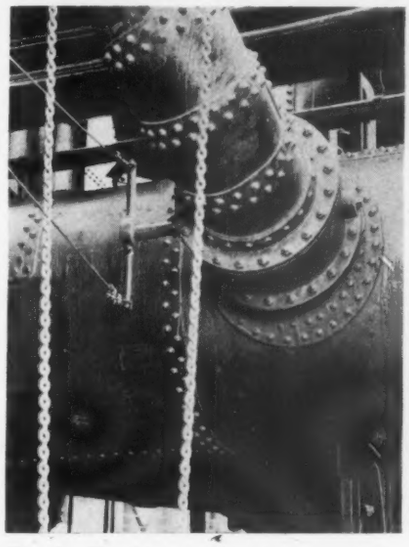


Fig. 3—Hot blast main near the stoves showing the main valve control operated by a motor-gear mechanism

may be understood more clearly from the diagram shown in Fig. 5. The

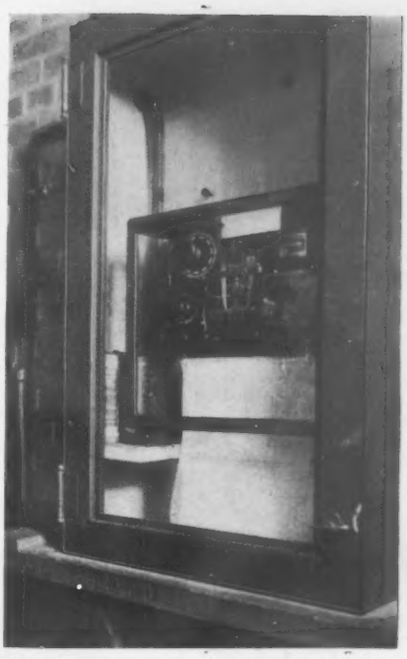


Fig. 4—View of compact control and recording mechanism enclosed in a glass case and wall mounted

parallel lines *L* and *H* represent the low and high-temperature limits and the lines *HS* represent the high-speed and anticipatory cutout limit. The curve shown represents a typical chart on blast furnace control. The development is upward from the bottom of the chart. The curve at the left of the diagram shows the movement of the valve corresponding with the various positions of the temperature indicator. At the point *A* the temperature has started to drop and the corrective movement of the valve is shown from *A* to *B* on the valve movement curve. The point *B* on the temperature curve indicates the start of a return toward normal and the valve position is held constant as shown from *B* to *C* on the valve curve. The temperature continues to rise until point *C* is reached at which point the high-temperature

(*Concluded on Page* 59)

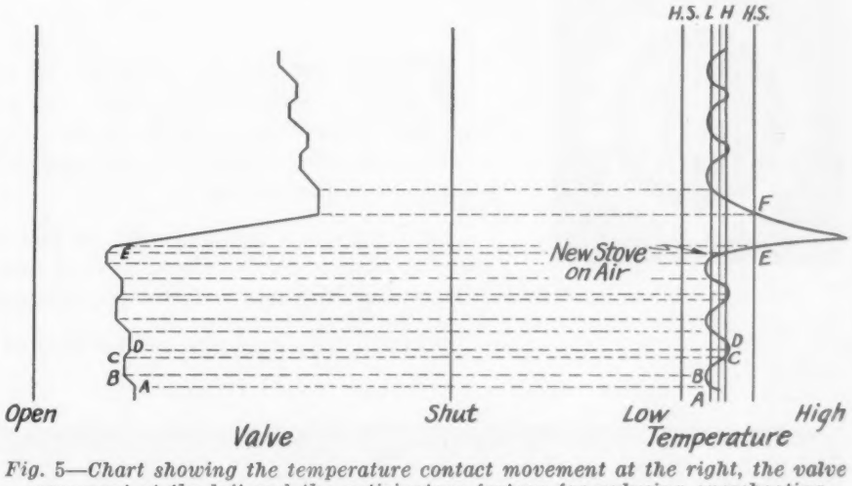
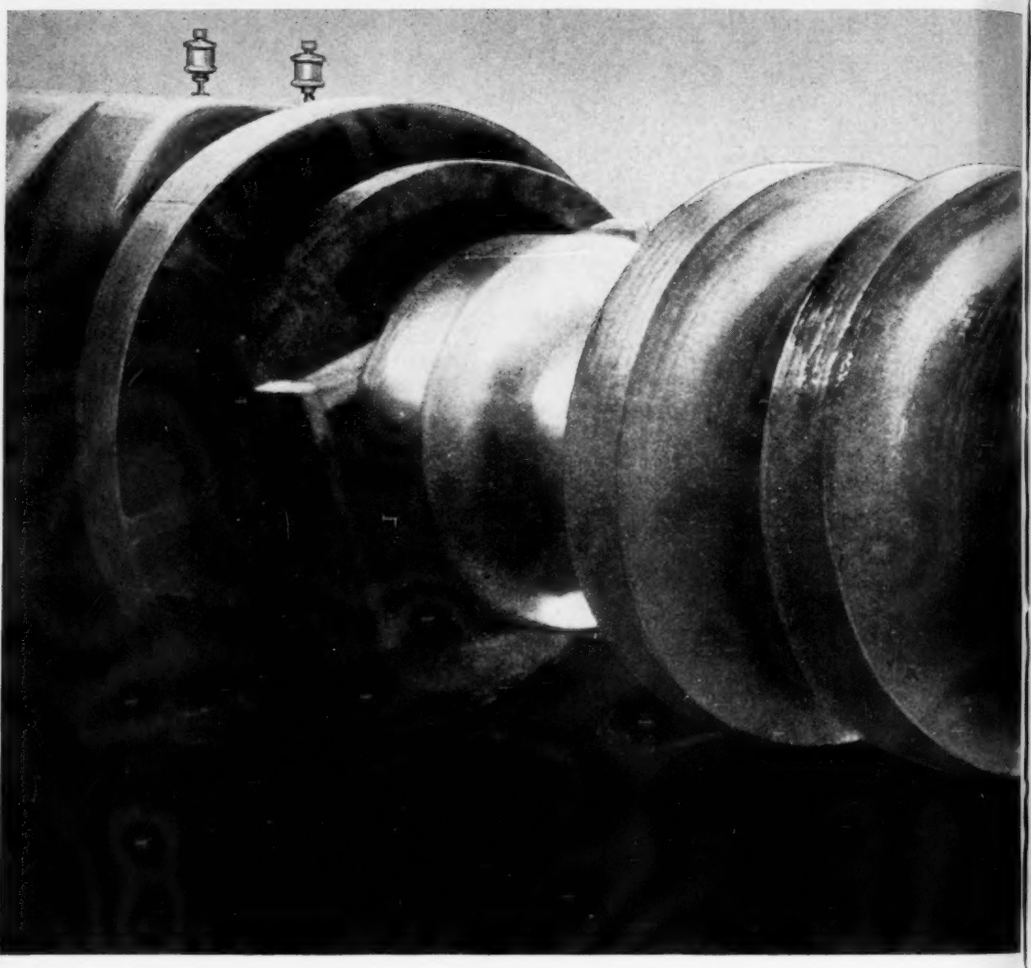


Fig. 5—Chart showing the temperature contact movement at the right, the valve movement at the left and the anticipatory feature for reducing overshooting

UNITED

EVERY ROLLING



UNITED ROLLS

Unefco Hard

Unefco Medium

Unefco Mild

Hot Mill Chilled

Regular Chilled

United Special Steel

Regular Steel

Lincoln Special Iron

Sand Iron

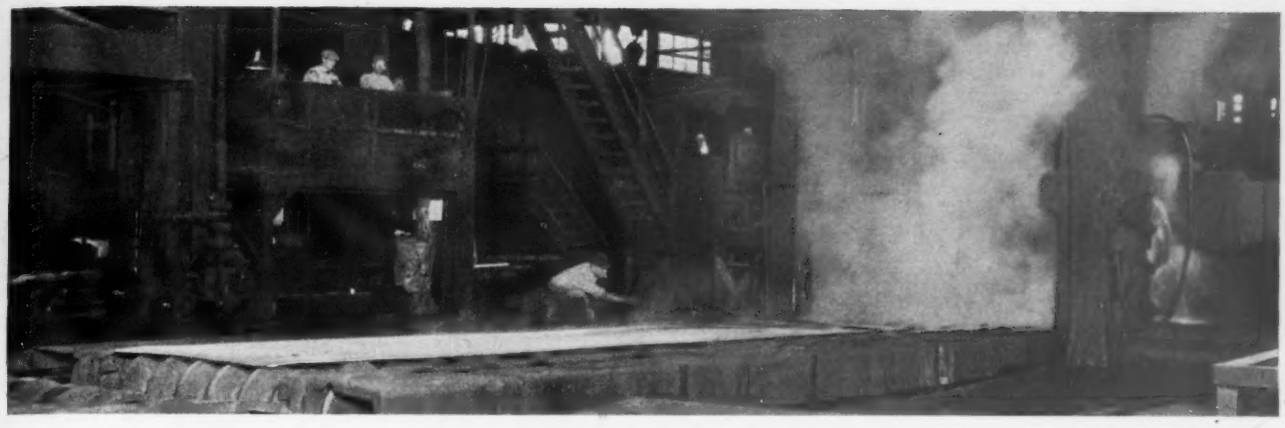
Adamite

SINCE the pioneer days of the steel industry "United" rolls have always been in preferred demand. As a result, there are more "United" rolls in service today than any other make. Whether you roll iron, steel, copper, brass, zinc, glass, silver, gold or other materials, there is a "United" roll ideally adapted for your requirements.

The illustration pictures one of the numerous, unusually large rolls designed and produced by "United." This cast steel roll was developed for a 54 inch Blooming Mill and weighs approximately 84,000 pounds.

"United" roll engineers will be glad to co-operate with you any time.

THE WORLD'S LARGEST MAKER OF



PROGRESS IN STEELMAKING

WHAT would a plate mill do without those orderly arranged rows of posts which stand like sentinels around the mill shears with castors in an inverted position—those posts in the floor known as the castor bed on which the heavy plates are manipulated to and from the shear knives? Step into the modern plate mill of today and observe what the period of transition has accomplished in the shearing department. Steel pipe supports, set in rows on the approach side of the shear, waist-high. Each pipe terminates in a large steel ball which rotates on a number of small steel balls held in a cup base. The plates ride on the large balls of the transfer. Handling costs have been revised.

RUSH drawings are prepared in a novel manner in the drafting room of a large steel company. A tracing cloth with its surface adapted for pencil work is used and after the design is completed, the surface is given a coat of varnish. Tracings thus treated are transparent, will not gather dust and will last indefinitely.

♦ ♦ ♦

Weight of the zinc coating is an important factor in determining the life of galvanized sheets. When a consumer specifies zinc coated sheets with a 2-ounce coating, the stock as delivered to the mill shipping department has approximately 1 ounce of zinc per square foot on each side. To insure the consumer against any variation in coatings, the American Zinc institute has adopted a "Seal of Quality" which manufacturers under license will stencil on each galvanized sheet in addition to the weight of the zinc coating and their name or trade mark.

♦ ♦ ♦

During the past two decades photography has taken a prominent part in the iron and steel industry. Illustrations are used as a medium to convey to buyers the character of rolling mill machinery and machine tools. Considerable data of special importance to the steel industry have been made available by photomicrographs which reveal the temperature at which steel is hardened or drawn; the depth of carbon penetration; the impurities that may be present; whether the steel has been hot or cold rolled, pressed or forged; and whether segregation of elements has occurred. Negatives on file at one large steel plant exceed 10,000 and cover numerous plant operations and items of an advertising, engineering, safety and medical character. No interpreter is needed where photographs are available because photography is a universal language.

♦ ♦ ♦

One of the seamless tube manufacturers is producing a product that has an amazing degree of accuracy and finish. The interior surface of its tubes resembles the bore of a rifle. For obtaining accuracy this company has a measuring device which will detect a variation in diameter up to 0.0002 of an inch. For some of its alloy seamless tubing it is obtaining $10 a foot.

At this same mill two unusual machinists are employed. The management considers them worth their weight in gold and pays them far more than the average machinist receives. These men have a strong mechanical bent and considerable inventive genius and represent the choice of the superintendent among many machinists that have come under his observation. Duties of these men include not only the maintenance of equipment but the development of new single-purpose machinery. Recently the company bought an expensive new mill and it was delivered in good order but never set up. The two machinists had thought of something new, and they now are building a different kind of a mill.

♦ ♦ ♦

Photoelectric tubes are finding new uses in the steel industry right along. In one plant the tubes are employed for counting ingots and bars in transit by the radiant energy of the hot steel. In another plant the radiant energy of the metal causes the tube to automatically operate the spraying equipment for descaling billets. In a welding shop where both resistance and intermittent line welding is employed, a thyratron tube control affords the making of 1000 spot welds a minute.

IN A Michigan sheet plant instead of having the time clock located in a centralized building where all workmen ring in and out, each department has its own clock. These are located at the various department entrances, and the arrangement affords an increase in the total time worked of 5 per cent.

♦ ♦ ♦

Is the bessemer converter due for a revival? Certain individuals in an important steel company believe so. With the increasing demand for special steels and alloy steels, they feel that it is increasingly desirable to make them in smaller tonnage units. These individuals believe that with the bessemer furnace special steels could be made in small tonnages, with better control

than is possible with the open-hearth furnace and at lower cost than obtained with the electric furnace. It is likely that actual investigation of the possibilities of the bessemer converter in making special alloy steels will be begun shortly.

♦ ♦ ♦

A feature of the three 50-ton open-hearth furnaces at the new steel foundry of the General Steel Castings Corp. at Eddystone, Pa., is the size of the doors. They are sufficiently large to permit charging scrap in large sizes, including whole bolsters. The company thus is in a position to buy a great deal of large scrap on which no expense for cutting to usual charging box sizes has been applied. Regenerators below the floor level are entirely encased in steel plate, and, as far as possible, the furnaces are insulated with 4½ inches of cork insulating brick inside the steel plates. The furnaces were designed by Arthur L. Stevens, Chicago.

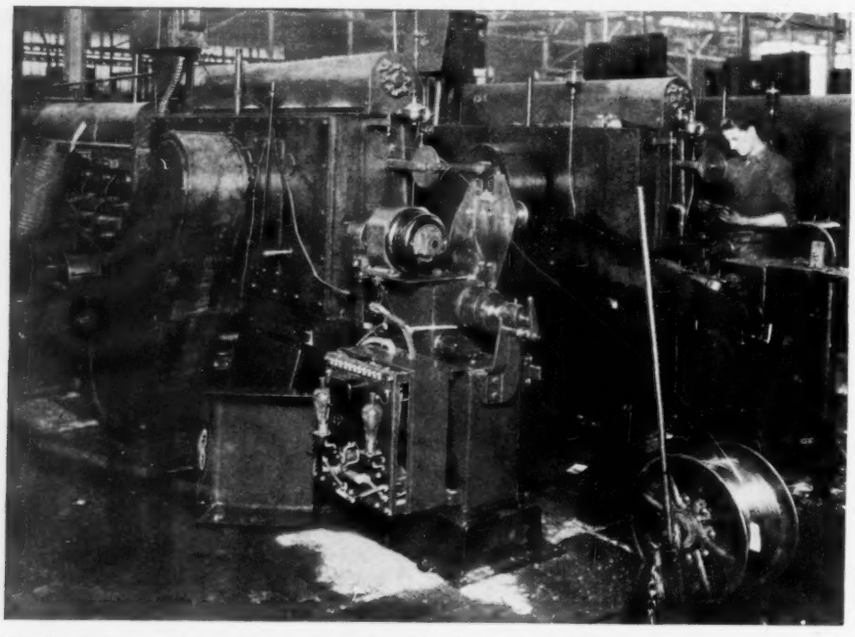
♦ ♦ ♦

In the office of an Eastern mill superintendent, in plain view of his desk, is a set of instruments which records the performance on the different mills. Recently one of the mills underwent a bad series of roll breakage. The superintendent examined the dial charts and found them to show that at the moment of breakage, in each case, the mill was operating at high speed. He issued instructions that a certain speed of rolling was not to be exceeded on this mill. Since then, there has been no more trouble due to abnormal roll breakage on this unit.

Thyratron Tubes Maintain Tension in Wire Drawing Equipment

WIRE produced in the cold-drawing department of the General Electric Co., Schenectady, N. Y., is kept at the proper tension as it is reeled by the use of thyratron tubes and equipment. The wire passes from a large reel through the wiredrawing equipment, where it is reduced to the desired size, thence to a small pool where it is re-reeled. As the wire is drawn at a constant rate, the speed of the re-reel spool must be decreased constantly as the effective diameter of the surface on which the wire is wound increases.

The re-reel spool is driven by a small direct-current motor, power being supplied to the armature by the tubes and controlled by a small reactor. This control is determined by the position of the core in the reactor, and the position of the core is governed by the re-reeling operation itself. The wire runs over a rider pulley, mechanically connected to the reactor core. As the loop on which the rider pulley rides decreases when the re-reel motor is running too fast, the core is drawn into the reactor, increasing its reactance and causing the tubes to pass less current and so causing the motor to slow down. Conversely, if the loop increases in length the reactor core is withdrawn causing the tubes to pass more current and so increase the motor speed.



Equipment for cold drawing wire, in which speed of re-reel spools is controlled by action of thyratron tubes

Alloys of Iron Research Issues Progress Reports

The Alloys of Iron Research, New York, organized by the Engineering Foundation in 1929, issued its first progress report on June 1, a 12-page folder recording work which has been done by the editorial office opened Feb. 1, 1930. To date 2000 technical papers from 30 journals in five languages have been reviewed and more than 6000 abstracts prepared, covering about 35 elements and 500 classifications.

Individual alloy systems have been assigned to co-operating groups and in some cases laboratory work is being pursued. Progress of the four groups is as follows:

Battelle Memorial institute is reviewing literature on the iron-molybdenum and iron-tungsten systems. It is also engaged in a critical survey of the iron-carbon diagram and constitution and properties of iron-carbon alloys. The review of literature of the iron-molybdenum alloys is completed; the manuscript of the iron-carbon mongraph is nearing completion. Progress on the survey of the iron-tungsten and iron-carbon systems is substantial.

Carnegie Institute of Technology has confined its work principally to basic research on the constitution of the alloy system, iron-manganese.

Lehigh university has completed a literature survey and prepared a bibliography of the iron-silicon alloys and silicon alloy steels. It also did considerable work on a monograph of the iron-silicon alloys. Laboratory research is under way with alloys at the low silicon side of the equilibrium diagram.

The bureau of standards is reviewing the literature on pure iron. The survey is approaching completion and a part of the manuscript has been written.

It is expected that several of the bibliographies and monographs will be published early in 1932.

Steel Founders To Convene

The first fall meeting of the Steel Founders' Society of America will be held in Chicago, Sept. 17. A meeting is scheduled also for New York, Oct. 22, the day preceding the fall meeting of the American Iron & Steel institute. Granville P. Rogers, 932 Graybar building, New York is managing director of the society.

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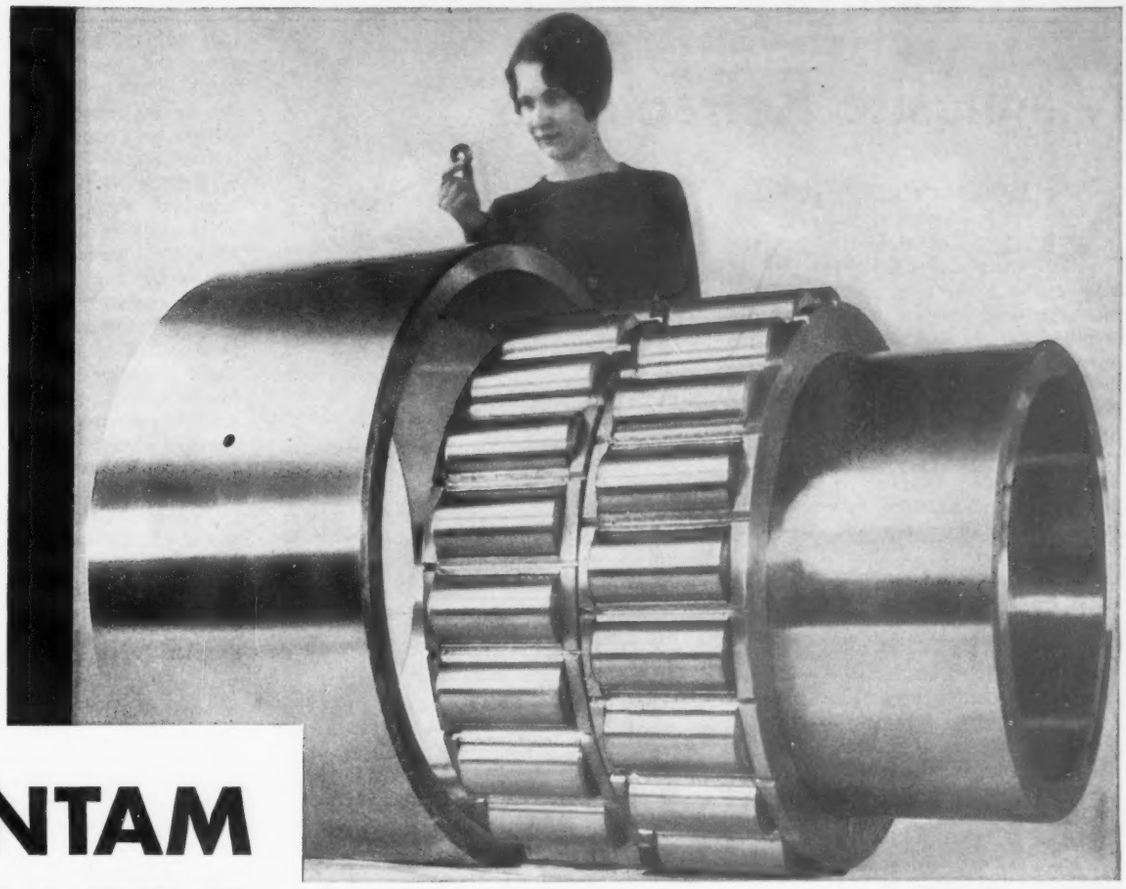

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Steel Industry Using Less Magnesite Refractories

MAGNESITE still is an essential refractory material for the steel industry, but the quantity used per ton of steel made, never very great, has been much reduced because of a larger use of dolomite and chromite for the same purpose. Since consumption is largely in the eastern part of the United States and domestic deposits are situated in California and Washington, this country's magnesite mining industry, created largely by war-time conditions, has subsequently been sustained by tariff protection. The cost of transport of the domestic product from coast to coast and the duties on imported magnesite have stimulated the search for substitutes.

A complete survey of magnesite, its uses, history, production, treatment, shipments and prices, has recently been prepared by Paul M. Tyler, chief engineer, rare metals and nonmetals division, bureau of mines, Washington, and published by the bureau in a 54-page information circular No. 6437. Portions of the circular, pertinent to the steel industry, are of interest and herewith abstracted.

Before the war between 6 and 14 pounds of magnesite were consumed to make a ton of steel, but economies enforced by the abrupt stoppage of imports from Austria-Hungary in 1914 soon reduced the consumption by one half. The tendency to restrict the use still is apparent. Although the output of steel ingots and castings has increased from 30,966,000 gross tons in 1913 to 56,433,473 tons in 1929, the indicated supply of magnesite, dead-burned for refractory purposes, was only 125,082 net tons in 1929, as compared with 164,000 tons in 1913.

Consumption Per Ton Reduced

On this basis, 10.6 pounds of magnesite were required per ton of steel in 1913; in 1929 the consumption had been reduced to 4.43 pounds. As a matter of fact, the average consumption for seven years, 1923-1929 amounted to only 4.16 pounds per ton of steel.

Since it is reasonable to assume that the consumption of dead-burned magnesite in the production of nonferrous metals and for miscellaneous purposes has not declined, these figures alone tend to indicate the magnitude of the market that has been lost by magnesite producers and importers. The steel industry, on the other hand, has made its position more secure. Formerly dependent solely upon Central Europe for this important material it now obtains about two-thirds of its needs from domestic mines and in addition uses other refractory materials both foreign and domestic, the supply of which can not be so quickly cut off.

Of the dead-burned magnesite employed as a refractory, about one-half of the domestic consumption is used in the form of brick and special shapes and one-half is purchased in loose condition by steel companies. Dolomite, or high-magnesium limestone, is an active competitor of magnesite and chrome refractories, in partiular, have found a much wider use, due in part to the higher prices for magnesite in the United States since it became dutiable under the tariff act of 1922.

Chrome Brick Less Expensive

Magnesite bricks are quoted at $65 a ton, which compares with $45 a ton for chrome brick. The standard size, 2½ x 4½ x 9 inches, weighs 9.5 pounds each in the case of magnesite brick and 10.5 pounds in the case of chrome brick. Therefore, chrome brick cost approximately $235 per 1000, as compared with $310 per 1000 for magnesite brick. In a 9-inch wall this means a saving of almost $1 per square foot.

To help meet this competition, unburned magnesite brick using a chemical binder has been placed on the market; they are quoted at $50 a ton, and being lighter they actually cost about the same as chrome brick. Such brick is used for the bottom layer and in the end walls of open-hearth furnaces.

Five or six years ago the output of chrome brick was scarcely 10 per cent of the output of magnesite brick, but at present it is estimated that the number of chrome brick produced in the United States at least equals and may considerably exceed the output of magnesite brick. Despite these heavy inroads into their field of use, the demand for magnesite refractories has continued to grow, because of the increased employment of high-duty refractories in place of ordinary fire brick.

Dolomite is much cheaper and far more widely distributed than magnesite. Though not so refractory it finds a considerable application about steel furnaces. The first successful bottoms used in basic open-hearth furnaces were made of burned dolomite, rammed in with tar. Later, it was found that bottoms made from dead-burned magnesite gave better service, but by employing high-lime slags and making other slight modifications in furnace operation, good steel can be made economically without the use of magnesite.

Raw dolomite is almost universally used, to the extent of 40 to 70 pounds per ton of steel as a patching material. A number of patented products consisting of dolomite treated with furnace dust or other binder and calcined have come into use at steel plants as partial substitutes for magnesite.

Refractories of the mullite type have made an appearance but are still too expensive to compete with magnesite. Some of the highly aluminous refractories, however, may be considered as competitive with magnesite for certain uses.

Production Up Sharply

Production of domestic dead-burned magnesite in 1922 amounted to only 2200 tons, but in 1929 it had reached a record total of 78,700 tons.

Domestic marketed production and imports for the years 1923 to 1929, as compiled by *Mineral Resources of the United States*, are as follows:

Year	Domestic sales	Imports	Total
1923	34,410	61,726	96,136
1924	29,830	48,651	78,481
1925	29,110	51,320	80,430
1926	42,540	75,535	118,075
1927	40,210	49,693	89,903
1928	45,230	57,007	102,237
1929	78,700	46,382	125,082

Exports of magnesite are small. Official statistics are not available, but records of the tariff commission reveal that during a six-month period in 1923 and 1924 less than 100 tons

ALTHOUGH magnesite still is required in steelmaking, high cost of both domestic and foreign supplies has stimulated the use of substitute refractories, dolomite and chromite. In 1913, consumption of dead-burned magnesite amounted to 10.6 pounds per ton of steel; for the seven years 1923-29, only 4.16 pounds per a ton were needed. Before the World war the United States imported the bulk of this material; today domestic sources supply the major portion. The economics of the magnesite industry as pertinent to the steel industry are set forth in the accompanying article.

of magnesite in all forms was shipped from this country. Small quantities of magnesite brick are shipped to Canada and Mexico.

Dead-burned magnesite usually contains from 8 to 14 per cent of impurities in the form of iron oxide, lime and silica, as these are necessary to form the bond and to facilitate sintering. In general, material for the refractories trade must be moderately low in silica (maximum 7.5 to 8 per cent), low in lime (1.5 to 3 per cent), and exhibit no ignition loss.

Shrinkage after heating up to 3000 degrees Fahr. should be practically nil. A mixture of sizes ranging from approximately ½ inch down to extremely fine particles generally is preferred to either all fine or all coarse sizes. Since sintered magnesite is practically uninjured by moisture, shipments often are made in bulk.

Prices Have Varied

In 1913, Austrian dead-burned magnesite sold in New York at $16.25 a ton; the lowest prices recorded before the war were $15.72 f.o.b. docks, Philadelphia; $15.60 f.o.b. New York; and $15.20 f.o.b. New Orleans. In 1929 the price was $19.40 per metric ton in Austria for domestic retail business and $25.50 c.i.f. Atlantic ports. The latter price is equivalent to $23.13 a net ton, to which should be added the duty of $11.50, making the land cost $34.63.

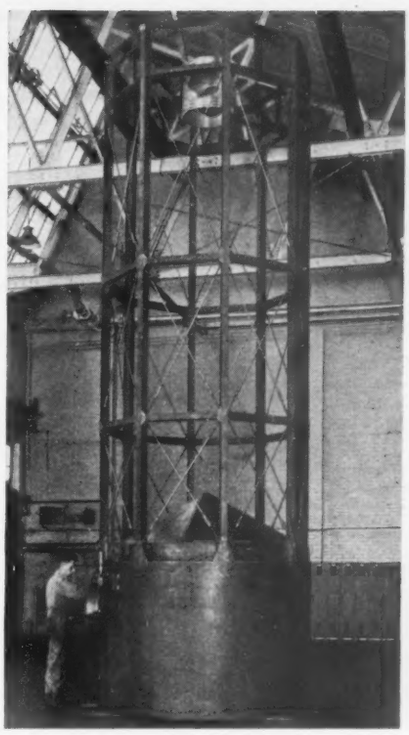
Early in 1928 the price of domestic grain magnesite was reduced from $29 to $22 a net ton f.o.b. Chewelah, Wash., and this was the price in 1930. The transcontinental freight rate is $18.40 a ton and, as the combination rail and water rate is only a few dollars less, the price of foreign and domestic magnesite delivered at eastern consuming centers is practically the same.

According to *Mineral Resources of the United States*, the average prices per net ton of dead-burned magnesite for the years 1922 to 1929 as reported by producers were as follows;

Year	Average sales price
1922	$23.30
1923	19.50
1924	26.40
1925	31.74
1926	25.62
1927	24.63
1928	23.80
1929	19.60

Gray Iron Institute Plans Fourth Annual Meeting

The fourth annual convention of the Gray Iron institute will open session at West Baden Springs hotel, West Baden Springs, Ind., Oct. 15 and continue through Oct. 16. Program will include reports of committees and officers, election of officers and directors, and complete discussions of the technical, merchandising and cost phases of the industry. Arthur J. Tuscany, Terminal Tower building, Cleveland, is manager of the institute.



WELDED TELESCOPE TUBE

This 23-foot 6-inch telescope tube, electrically welded throughout, was completed recently by the Warner & Swasey Co., Cleveland, for installation in an astronomical telescope at the Perkins observatory of Ohio Wesleyan university, Delaware, O. Materials employed were standard steel I-beams, angles and plates. Rigidity is supplied by tie rods, electrically welded in the corners at the intersections of longitudinal and transverse members of the skeleton. The conical section near the base is an orange peel type of shutter covering the 69-inch telescope mirror. A reduction in weight of the tube of about 1500 pounds was accomplished by welding. Equipment for the welding work was furnished by Lincoln Electric Co., Cleveland

Hot Blast Temperature Controlled Automatically

(*Concluded from Page 49*)

contact is closed causing the valve to move as indicated by the line on the valve curve from *C* to *D*.

This general scheme of control continues until a new stove is put on air causing a sharp peak in the temperature curve. When the contact is made with the high-speed parallel at *E* the valve mechanism is moved back as rapidly as possible. This action is produced by means of a variable-speed motor on the valve and operating mechanism which gives an increase in speed of 400 per cent. This corrects the rapidly rising temperature quickly. Beyond *E* the anticipatory action is cut out but is cut in again when the temperature makes the return contact with the high-speed line at *F*.

Couple in Hot Blast Main

Blast furnace temperatures frequently are regulated at three points, the first in the hot blast main, the second in the downcomer and the third at the stoves. The location of the thermocouple in the hot blast main just before the main enters the bustle pipe is shown in Fig. 1.

Some of the features claimed for automatic control of hot blast temperature are as follows: Better melting due to a uniform hot band above the tuyeres, less dust, less labor changing stoves and operating valves, larger tonnage, reduction of gas pressure in the main, no seesawing of temperatures after casting, longer life of furnace lining, more accurate control of quality of iron, fewer tuyere failures, and lower losses due to unnecessary use of large volume of heated air at time of stove changes.

European Societies Hold Meetings in September

The autumn meeting of the British Institute of Metals will be held in Zurich, Switzerland, Sept. 13-15, at the invitation of the Schweizerische Verband fur Materialprufung. Headquarters will be at the Savoy hotel.

Prior to this, the new International Association for Testing Materials will hold its first congress in Zurich, Sept. 6-12. Both meetings were so scheduled to give visitors an opportunity to attend the International Foundry Exhibition and congress in Milan, Italy, Sept. 12-27.

Electrical Engineers Pick Convention Dates

Schedule of national and district meetings for the remainder of the calendar year, 1931, and for the entire year 1932, has been announced by the American Institute of Electrical Engineers, through the office of F. L. Hutchinson, national secretary, 33 West Thirty-ninth street, New York.

The annual Pacific Coast convention will be held Aug. 25-28 at Lake Tahoe, Calif.; and a district meeting Oct. 22-24 at Kansas City, Mo. In 1932 the annual winter convention will be held Jan. 25-29 at New York; annual summer convention June 20-24 at Cleveland; and annual Pacific Coast convention Aug. 29-Sept. 2 at Vancouver, B. C. District meetings will be held in March, May, October and November, at Milwaukee, Providence, R. I., Baltimore and Memphis, Tenn., respectively.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

Wire Testing

Testing wire for fatigue, discussed by S. M. Shelton, in preprint paper No. 40, American Society for Steel Treating, 1931, 10 pp., 4 illusts.

The endurance limits of test coupons with machined surfaces cut from a structural member cannot be relied upon as the true fatigue limit of the structural member itself. A method is described for the determination of the fatigue limit of wire in its structural shapes and condition. The specimens used are long enough to obtain sufficient increase in fiber stress in the medial transverse plane of the specimen without reducing the specimens cross-sectional area. Principles of critical speeds and means of avoiding their effects are outlined briefly. Results are shown for tests of high-carbon, heat-treated and galvanized steel wire; for the same wire with the zinc coating removed; and, low-carbon steel wire. The possibility of using the method for fatigue testing of other structural shapes such as pipe and tubes deserves additional investigation.

—STEEL, 7-16-31

Oiling Systems

Circulating systems for oiling steel mill equipment, discussed by L. W. Kohler, in Blast Furnace and Steel Plant, July 1930, p. 969, 3 pp., 4 illusts.

Because some oil ranges in viscosity as high as 2600 seconds Saybolt at 100 degrees, provision must be made for permitting a free flow of the oil in low surrounding temperatures. In selecting a proper oil for use in circulating systems, consideration must be given to the pressures to be encountered and an oil with a viscosity and film strength to withstand these pressures must be used. The oil should have as high a demulsibility and as low a cold test as possible, because considerable moisture is ever present in the steel mill, and in the northern climates low temperatures may be encountered; thus an oil with a low cold test that will flow freely at low temperatures is essential. The circulating oiling system maintains a constant pressure of lubricant at all the points of lubrication regardless of surrounding temperature and assures a copious stream of clean cool lubricant being applied at all times. The cost of lubrication per ton of steel rolled is reduced to a minimum; actual records show that in systems circulating approximately 150 gallons per minute of oil, the consumption is less than one barrel a week.

—STEEL, 7-16-31

Spark Test

Differentiation between alloy steels by spark testing, discussed by A. K. West, in American Machinist, July 9, p. 72, 3 pp., 7 illusts.

The spark test is not a test for the quality of steel with regard to laps, seams, hardness, inclusions or grain size, nor is is quantitative and, therefore, cannot be used to determine the analysis of unknown alloys selected at random. The value of the process is that mixed steels can be separated with a degree of certainty only by the carefulness of the tester. The apparatus used consists essentially of a portable grinder and a pair of safety goggles. The shaft speed of the grinder is 15,000 revolutions a minute which gives the wheel a peripheral speed of 5000 feet a minute. It has been found that the best conditions for observing sparks is by the use of a half light or the light ordinarily found in the factory is better, but the sparks should be observed against a dark background afforded by a tarpaulin or cloth.

—STEEL, 7-16-31

Crucible Tool Steel

Production of tool steel in crucible melting furnaces, by Owen K. Parmiter, Metal Progress, July, 1931, p. 55, 4 pp., 3 illusts.

Modern tool steel had its beginning with Huntsman in Sheffield, England, in 1740. Huntsman melted down pieces of broken carburized steel in a crucible. The first tool steel company was organized in 1751. From that time on progress in tool steel was relatively slow until the advent of modern analytical chemistry again revolutionized the production of quality high-carbon steel.

In America the few remaining crucible melting furnaces, fast being displaced by the electric arc furnace and the induction furnace, are of the Siemens regenerative type or some modification of it. The usual furnace has a capacity of 30 pots, each pot accommodating a little less than 100 pounds of steel. The furnace usually has five melting compartments, each holding six pots. Six heats every 24 hours is the customary practice.

The crucible method is not one of refining; impurities such as sulphur and phosphorus cannot be removed. Deoxidation depends upon silicon absorbed from the pot. The pots always are covered and as the steel melts down, the pot cover fluxes and seals the pot, thus excluding atmospheric gases. This is one of the reasons for the high quality of crucible steel.

—STEEL, 7-16-31

Welding in Steel Plants

Applications of oxyacetylene and other methods of welding in steelworks maintenance, discussed by E. L. Quinn, in Journal of the American Welding society, June 1931, p. 6, 4½ pp.

In selecting a rod for a particular welding job, the service to which the equipment is subjected and the analysis of material must be considered if best results are to be obtained. The use of thermit welding is confined principally to heavy sections and where relatively large amounts of weld material are required. The reclamation of rolls presents itself as the predominating application where thermit welding is employed. The cost of thermit welding usually is based on pounds of weld metal and amounts to about $0.60 a pound of thermit poured. Electric welding in maintenance work is one of the most important processes. Welding of steel castings, structural welding, tanks and stacks are some of the general uses. Electric welded stacks have the advantage of securing better draft conditions by tightness. Principles advanced by the author are: First, work with the metallurgical department in determining the best rod to use, the analysis of material and the quality of weld obtained. Second, when failures occur and welding is employed for repair purposes, study the failure to determine its origin.

—STEEL, 7-16-31

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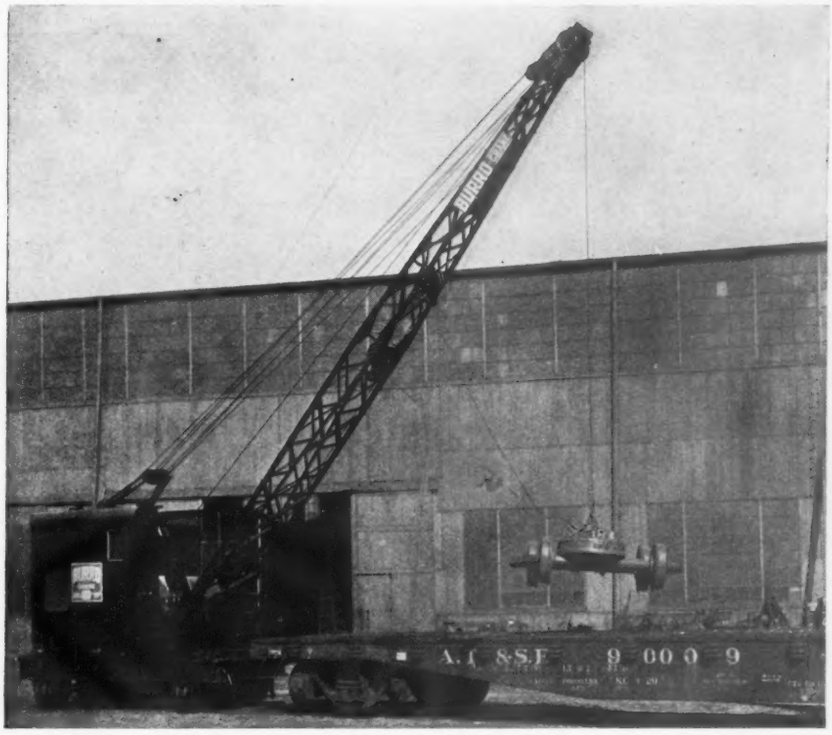

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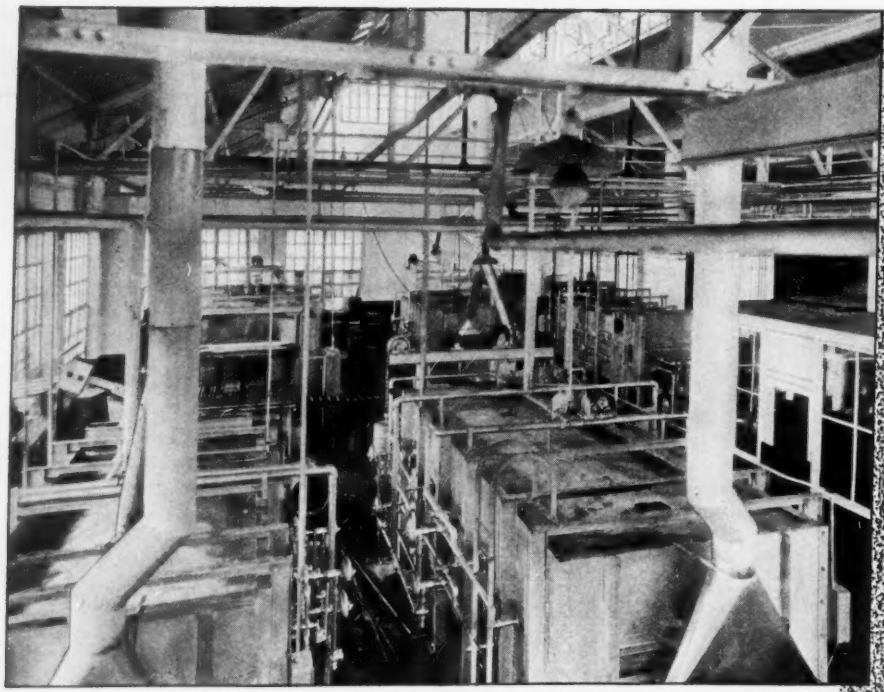
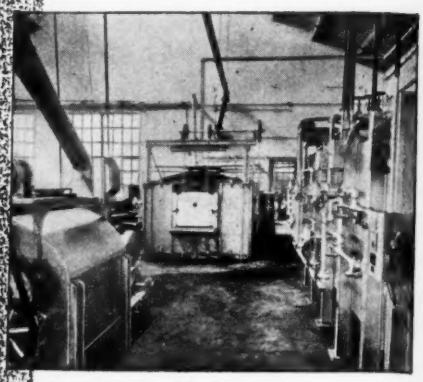
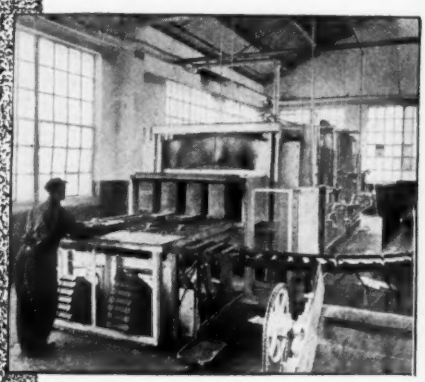


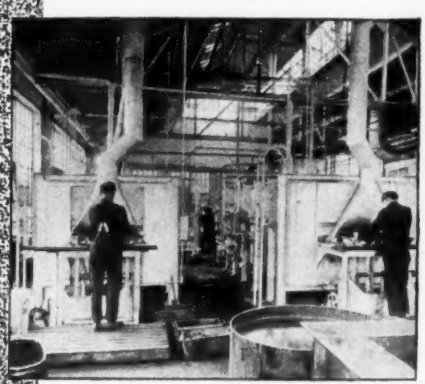
General view of the heat treating room in a large automobile parts factory. Armstrong's Insulating Brick are used to confine the heat to the furnaces.



Front view of box type furnace used for annealing or carburizing.



Charging end of continuous carburizing furnace—insulated with Armstrong's Brick



Charging end of alloy tube hardening furnace in the same plant.

High temperatures are kept *inside* the heat treating furnaces by Armstrong's Insulating Brick . . .

VISITORS to the plant of a prominent manufacturer of automobile parts wonder at the comparative coolness of the heat treating rooms. They are still more amazed to learn that a separate heating system is needed to keep sprinkler pipes from freezing in winter! This in spite of temperatures as high as 1700° F. in the furnaces.

There are several furnaces in the heat treating room—furnaces for carburizing and hardening large and small parts. Each unit is insulated with Armstrong's Insulating Brick. Walls are covered with a 9-inch layer, arches with 9 inches, and bottoms with 7½ inches. With this efficient insulation, the room is cold despite the high furnace temperatures.

Fuel consumption is less and working conditions are improved when high temperature furnaces are insulated with Armstrong's or Nonpareil Insulating Brick. The latter is used for temperatures up to 1600° F., Armstrong's to 2500° F., both behind the refractory. There are further savings in the fact that both these brick are machine-sized for ease and accuracy in laying up. See them and test them for yourself—we will gladly send you samples on request. Address Armstrong Cork & Insulation Company, 920 Concord Street, Lancaster, Pennsylvania; Canadian offices in Montreal, Toronto, and Winnipeg.

Armstrong's Ⓐ Product

Armstrong's and Nonpareil Insulating Brick

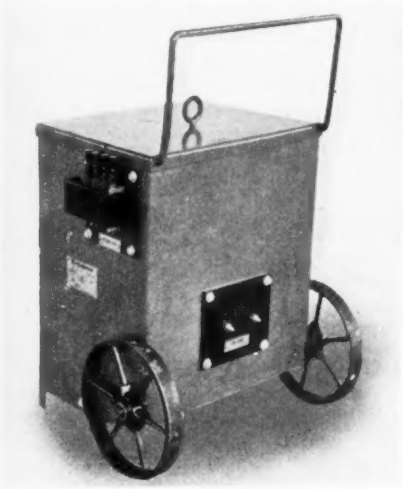
FOR FURNACES, OVENS, KILNS, AND LEHRS

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Arc Welder Designed for Thin-Gage Materials

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is introducing a new alternating-current arc welding set for operation at between 8.5 and 125 amperes, designed to meet the demand for economical arc welding of thin-gage material such as that encountered in the manufacture of metal furniture, sheet iron cabinets and containers, aircraft work, erection of ventilating and materials handling equipment, etc.



Westinghouse alternating-current portable arc welder for welding thin-gage material

The welder may be used in conjunction with either bare or coated electrodes from 1/32-inch to ⅛-inch diameter. Many of the ferrous alloy materials commonly used with reversed polarity direct current are applied effectively in conjunction with this welder which also has proved successful in welding aluminum.

The entire equipment, consisting of a special self-cooled transformer, short wave arc control system and current regulating details, is mounted substantially in a compact welded steel case, as shown in the accompanying illustration. A special high-frequency arc stabilizing circuit developed by Westinghouse engineers is claimed to eliminate the usual high open-circuit secondary voltage. The maximum open-circuit voltage at the work is only 73 volts, thereby assuring safety to the operator at all times. High operating economy is made possible by a high average power factor and low no-load power requirements.

Low maintenance cost is obtained by having no moving parts and a totally enclosed construction. The welder is light in weight, compact and readily portable. The short wave arc control is claimed to eliminate interference to radio reception and to provide a stable and flexible arc at all current values, thus assuring speedy and simplified welding operations.

◆

Metallographic Polishing Machine Is Automatic

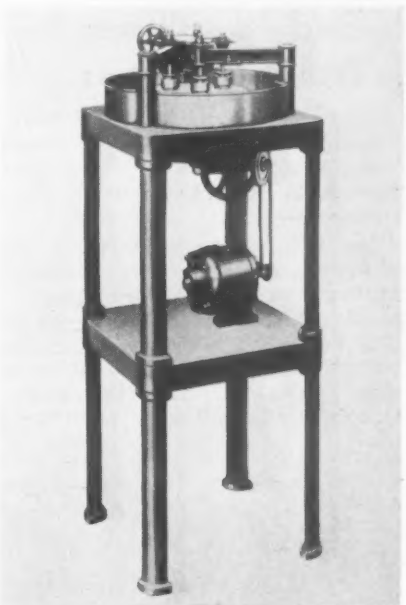
American Instrument Co. Inc., 774 Girard street, Washington, has developed an automatic metallographic polishing machine, based upon a similar machine, designed by the bureau of standards, to effect a standardization of methods employed in polishing specimens of metals for microscopic examination.

Polishing Is Mechanical

The new polishing machine, shown in the accompanying illustration, is provided with a polishing head mounted on a vertical spindle driven through a belt by a motor mounted on a shelf below the polishing head. The head is covered with a suitable polishing cloth. The specimens to be polished are held firmly in ring holders which float on the polishing cloth and change their positions slightly as the contour of the cloth changes. Slight pressure against the holders is provided by springs attached to horizontal arms which carry spindles to which the ring holders are attached. At the top of each specimen spindle is a gear which meshes with a central eccentric gear.

The eccentric gear is driven through a speed reducer and as it rotates it causes the three specimen holder gears to rotate also. Being meshed with an eccentric gear, the three specimen holder gears not only rotate on their own axes, but continually oscillate toward and away from the center of the polishing disk. Thus the specimen is free to move vertically within limits, is rotated on its own axis, and is moved slowly from the outer edge to the center of the polishing disk. This is claimed to produce a high grade of polishing work without the constant attention of an expert metallographist.

Three specimen holder arms are provided, as shown in the illustration. Extra equipment includes a metal cover for the polishing disk and a spare polishing disk.



Automatic metallographic polishing machine built by American Instrument Co. Inc.

◆

Speed Reducers Developed In Small Sizes

W. A. Jones Foundry & Machine Co., 4401 West Roosevelt road, Chicago, announces the introduction of a new line of small herringbone-Maag speed reducers. Capacities range up to 18 horsepower with reduction ratios from 12 to 1 up to 48 to 1. The smallest reducer in this series is 20 5/16 inches long and 4¼ inches high. The base measures

10¼ inches wide. An accompanying illustration shows one of the double-type reducers with hood removed to show gearing.

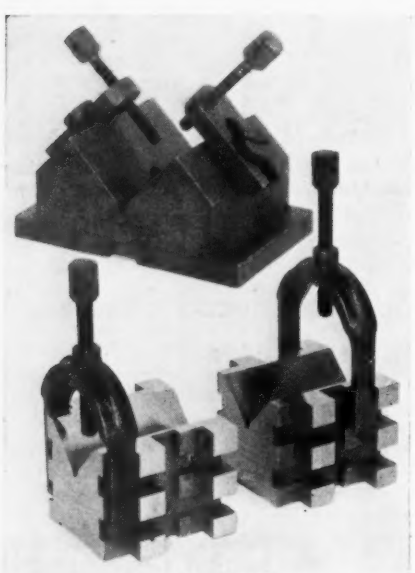
For universal application all the reducers in this series have high and low-speed shaft extensions on both sides, thus eliminating the necessity for right or left hand assembly. Two shaft guards are provided. On the high-speed side the herringbone gears and high-speed pinion teeth are generated by rack-shaped cutter, with straight sides, used in a precision gear planer. This is claimed to be the simplest and most accurate method known for precise generation of herringbone gears. On the low-speed side the Maag spur tooth form is used because of the greater strength needed at this point. This combination is said to make an exceptionally efficient, quiet and economical speed reducing arrangement.

◆

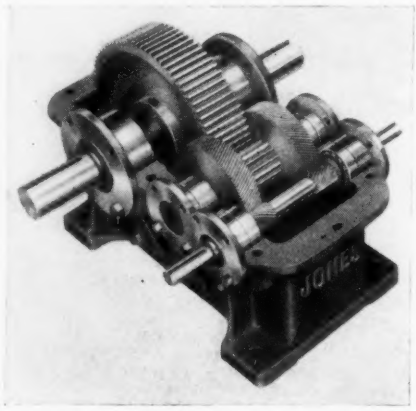
V-Blocks and Clamps Aid In Tool Room Set-ups

Brown & Sharpe Mfg. Co., Providence, R. I., announces a new line of V-blocks and clamps. A set of these appears in the accompanying illustration.

The units shown in the lower part of the illustration have stepped clamping lugs and are recommended for inspectors' use. These blocks can be used on their sides, since the clamps do not project. Stepped construction also allows changing the clamps quickly from small work to work up



Brown and Sharpe hardened steel V-blocks and clamps for toolroom use



Double-type small size speed reducer, built by W. A. Jones Foundry & Machine Co.

to approximately 2-inch diameter.

The blocks are ground in pairs, all sides being at right angles. The V-grooves of each pair are ground exactly central and in perfect alignment. The blocks are made of hardened steel and are 2½ inches long, 2¾ inches wide and 2 inches high. Clamps are drop forged and clamp screws hardened. These blocks are made and sold only in numbered pairs.

Open Type Is Built

The other type of block, shown at the top of the illustration, is designed to leave the entire top side of the work accessible. They are designed to hold stock either of square or rectangular cross section, as well as round stock. A hole through the center of the block allows drills, drifts, etc. to project through the work, which is a distinct advantage on many jobs. A tongue in the bottom of the block is a convenience when the block is used on a machine table where it can conveniently be clamped by the flanges.

This type of block, which is recommended for relatively light work, is of hardened steel, 3 inches long, 4¾ inches wide and 2 inches high. Its bottom is ground; clamps and screws are hardened, and the block has capacity for round stock up to 1½ inches diameter.

◆

Automatic Milling Machine Has Two Spindles

Superior Machine & Engineering Co., 1930 Ferry Park, Detroit, recently has developed a double-spindle automatic milling machine with a special fixture for holding piston rings when sawing them apart. Work is clamped and unclamped by the movement of the table, the dwell of which can be regulated so the operator will have ample time to put work in place and remove it when finished. The table feed can be disengaged at any time and the table and fixture operated by hand for convenience in setting up a job. Graduated dials are provided for adjusting screws.

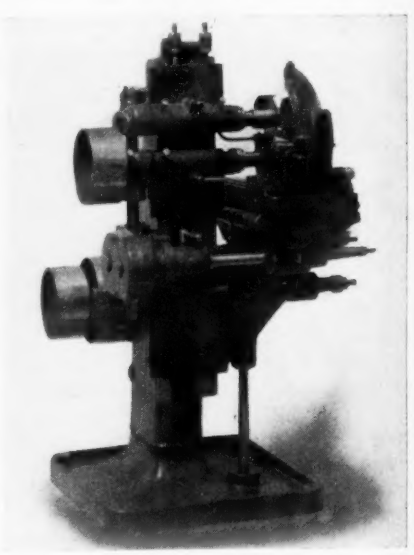
Shown in the accompanying illustration, this type of machine allows various designs of fixtures to be used to advantage in order to handle the different kinds of work to advantage. Spindle speeds are changed by means of pulleys and the feed of table through change gears. The machine is designed for rapid and accurate production, and can be set up and changed from one job to another quickly.

Spindles are hardened and ground and run in bronze in a bath of oil. All gears are hardened steel. The main drive and other shafts are mounted in antifriction bearings. The machine does not require a countershaft, but can be belted direct from the main line or can be driven by a motor. The main driving pulley is made for a 4-inch belt and is 10 inches in diameter. Weight of the machine is approximately 2000 pounds.

◆

Bench Miller Is Driven Through V-Belts

Hardinge Brothers Inc., 4149 Ravenswood avenue, Chicago, has placed on the market a new motor-driven bench milling machine. Shown in an illustration on Page 66, the machine is driven through a special type of V-belt under-bench trans-



Double-spindle automatic milling machine developed by Superior Machine & Engineering Co.

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IT is significant of the value of Reading genuine Puddled Iron's reputation that metal after metal, coming on the market, has cloaked itself in the mantle of iron.

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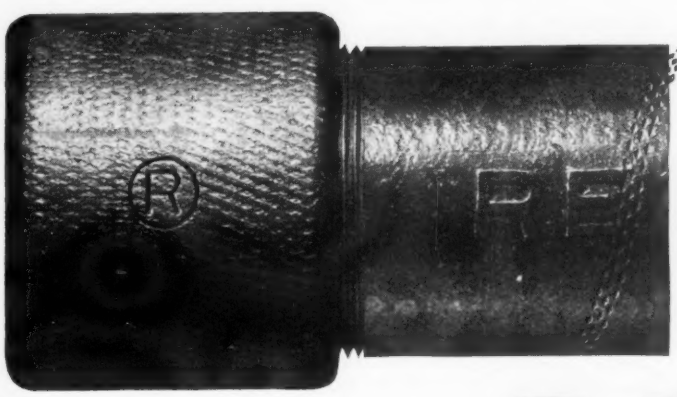

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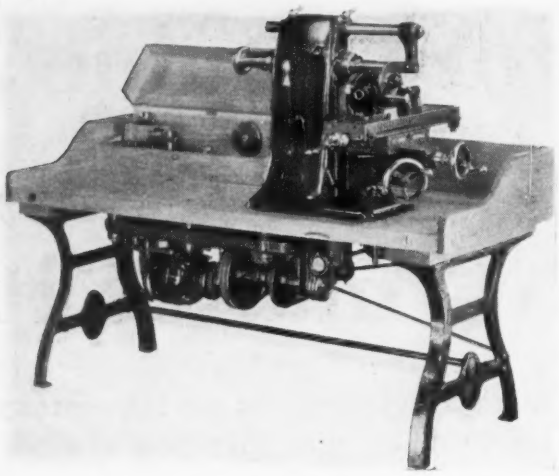


HARDINGE BROS. INC. has developed this new motor-driven bench milling machine for handling most milling jobs connected with general tool and experimental work

mission, designed by the same manufacturer. Two V-belts are used to drive slow speed, which provides greater power for the machine. The mill is built rigidly and will handle most milling jobs encountered in general tool and experimental work.

The unit has a range of six speeds from 160 to 1400 revolutions per minute, forward or reverse. The bench is built rigidly to minimize vibration. A collet and attachment box are mounted on the back of the bench to take care of the various attachments that can be used with the machine.

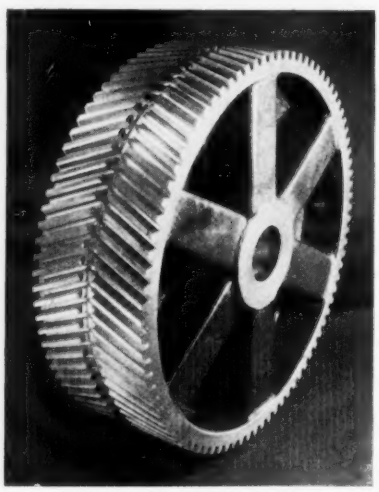
Collet capacity of the cutter head is 1 inch, while diameter of the arbor is ⅞ or 1 inch. Working surface of the table is 20 by 6 inches, with three $\frac{7}{16}$-inch T-slots; the table has a range of 1 inch longitudinally, 6½ inches transversely, and 6½ inches vertically. Maximum capacity of the swivel vise is 2½ inches. A ¾-horsepower 1200 revolutions per minute motor is suitable.

◆

Rubber Packing Suitable For Hydraulic Presses

Diamond Rubber Co. Inc., Akron, O., announces a new product, known as rubber crimps, or U-type hydraulic packing, for service on hydraulic rams and presses. The new packing is made in rings of standard sizes, with a U-shaped cross section. The rubber is compounded especially to resist oil, effectually eliminating this source of trouble. It is covered almost completely with a layer of fabric, which adds to the strength and helps to maintain the ¼-inch flare at the bottom.

The following advantages for the new packing are claimed by the maker: Low cost; suitable for use with pressures up to 3000 pounds; not affected by the heat generated in hydraulic presses; wears slowly and evenly; and provides a snug fit against the ram at all times. Thickness vertically through the center is ¾-inch, tending to stiffen the flare and increase the strength and life of the packing.



Gear made up of rolled and forged steel parts welded together, a product of Philadelphia Gear Works

◆

Welded Steel Gears of Rolled and Forged Parts

Philadelphia Gear Works, Philadelphia, is manufacturing a new type of gear from rolled and forged steel fabricated by welding, one of which is shown in the accompanying illustration. The rim is cut in the form of a solid ring from S.A.E. 1040 rolled steel plate. A solid rolled steel disk forms the web of the gear, against which channel shaped arms, dieformed from heavy plate, are welded to both sides.

Either four or six arms are used, according to the size of the gear. In small sizes, the web is of sufficient strength to require no additional reinforcement. The hub is a forged steel bar drilled to receive the shaft. Hub, arms, web and rim are welded into an integral structure and then normalized before machining to insure permanent alignment.

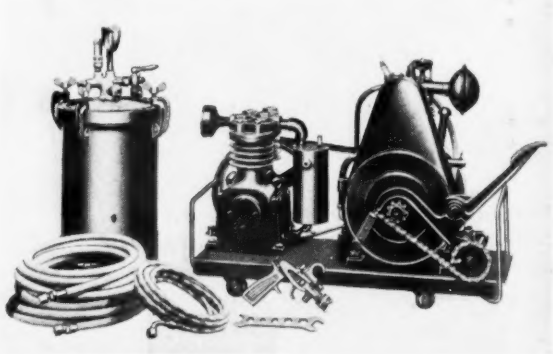
◆

Small Spray Painting Unit Is Gas Engine Driven

De Vilbiss Co., Toledo, O., recently has developed a light-duty, gas engine driven spray painting outfit for industrial use. It is intended to bring the efficiency and economy of spray painting to small work at points where electricity is not available.

The outfit consists of one of this company's spray guns with adjustable head and wrench, a 20-foot length of 5/16-inch air hose together with necessary connections, a 12-foot length of ¼-inch braid-covered hose with connections, a 12-foot length 5/16-inch special fluid hose with connections, a 2-gallon paint tank, and a ½-horsepower gas engine driven compressor unit mounted on a truck.

GAS engine driven compressor unit, paint tank, spray nozzle, hose and wrench are included in this De Vilbiss paint spraying outfit



Adjust Prices To End Concessions

Makers of Plates, Shapes, Bars, Establish 1.60c Minimum—Operations at 33 Per Cent—Iron and Steel Composites Down—Scrap Higher

PRODUCERS of steel bars, plates and shapes are attempting to correct a highly irregular price situation by outlawing all concessions under 1.60c, Pittsburgh, establishing that level for preferred customers and continuing 1.65c for ordinary buyers.

This move takes frank cognizance of disturbing reductions, usually made to close specific business of attractive proportions. These reductions have been most marked in building steel—on structural material and billet bars for reinforcing bar warehouses.

In some directions a 1.60c minimum represents a strengthening of the market; in others it may entail a scaling-down of contracts written at 1.65c. The immediate result is to make the Pittsburgh market quotable at 1.60c to 1.65c, the bulk of the business going at 1.60c.

In this revision, which is applicable for the remainder of the third quarter, Cleveland is made a base on plates for railroad work, at 1.65c, or $1 per ton above Pittsburgh. On new business, soft steel bars at Cleveland will be quoted at 1.70c, buyers to pay the switching charge which in some instances has been waived.

A highly competitive market at Detroit on carbon bars, which are an item of heavy consumption by the automotive industry, prompts an outside producer to announce a base of 1.75c there. Whether the recent completion of a bar mill at Detroit will result in a permanent base or whether a less competitive situation will reinstate Pittsburgh as base remains to be seen.

Opinion within the steel industry is divided whether these revisions in plate, shape and bar prices, affecting a greater tonnage of finished steel than any other classification, are designed to stem the retreat or constitute the adjustment which frequently denotes the bottom of a price movement and foreruns improvement. At the moment, the former theory carries more weight.

Nevertheless, in spite of what has the effect of a price reduction, and a continuation of a 33 per cent operating rate, sentiment in the steel industry still names July as the low month and invests late August with the expectation of improvement.

Automotive requirements are receding fast, weekly output of passenger cars and trucks being down to 60,000 units. Railroad buying is a trifle more brisk, with Norfolk & Western placing 20,000 tons of rails, and demand for miscellaneous cars and underframes improving.

But, as in many weeks this summer, tonnage requirements are almost an exclusive feature of plates and shapes. For two gas holders at Philadelphia 8000 tons—mainly plates—are required, and for 11 destroyers 6000 tons of steel. Milwaukee has purchased 3000 tons of plates and sheet piling for harbor work; inquiries for 5000 tons of tank plates are noted at Chicago.

Only a legal hitch over disposal of bonds delays the placing of 110,000 tons of steel for the Golden Gate bridge, it being expected the structural material—72,000 tons—will go to the low bidder, Bethlehem Steel Co.

Fresh structural steel inquiry this week totals 35,564 tons; and awards, 23,000 tons, compared with 32,108 tons last week. Fifteen thousand tons will be purchased for the New York parcel post building.

Scrap prices continue to offer resistance; at Pittsburgh heavy melting steel has advanced 25 cents. Larger inquiries for pig iron are noted in some districts. Foundry coke demand is quieter.

STEEL's iron and steel composite this week is down 13 cents to $30.98. The finished steel composite is off 30 cents to $48.52, while the steel scrap composite is up 8 cents to $8.66.

Composite Market Averages

	This Week (July 15)	Last Week (July 8)	One Month Ago (June, 1931)	Three Months Ago (April, 1931)	One Year Ago (July, 1930)	Ten Years Ago (July, 1921)
Iron and Steel Composite ..... (Pig iron, billets, slabs, sheet bars, wire rods, pipe, tin plate nails, sheets, plates, shapes, bars)	$30.98	$31.11	$31.02	$31.59	$33.21	$38.14
Finished Steel Composite ..... (Plates, shapes, bars, sheets, hot strip, nails, wire, tin plate, pipe)	48.52	48.82	48.60	49.22	51.90	60.54
Steelworks Scrap Composite..... (Melting steel, compressed sheets)	8.66	8.58	8.84	10.12	12.58	9.94

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	July 15, 1931	June, 1931	April, 1931	July, 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.26	18.26	20.46
Basic, valley	17.00	17.00	17.00	18.20
Basic, eastern del. eastern Pa.	16.75	17.00	17.25	18.00
No. 2 foundry, del. Pittsburgh	18.26	18.26	18.26	19.46
No. 2 foundry, Chicago	17.50	17.50	17.50	17.90
*Southern No. 2, Birmingham	12.00	12.00	13.00	14.00
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	17.76	17.76	18.26	20.26
Malleable, valley	17.00	17.00	17.00	18.70
Malleable, Chicago	17.50	17.50	17.50	17.90
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	17.63	18.83
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.40	2.40	2.50	2.50
Connellsville foundry, ovens	3.25	3.25	3.25	3.50
SEMIFINISHED MATERIAL				
Shee bars, open-hearth, Youngs.	29.00	29.00	30.00	31.00
Sheet bars, open-hearth, Pitts.	29.00	29.00	30.00	31.00
Billets, open-hearth, Pittsburgh	29.00	29.00	30.00	31.00
Wire rods, Pittsburgh	35.00	35.00	36.00	36.00

	July 15, 1931	June, 1931	April, 1931	July, 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.60	1.65	1.65	1.70
Steel bars, Chicago	1.70	1.70	1.80	1.80
Steel bars, Philadelphia	1.89	1.94	1.96	1.94
Iron bars, Chicago	1.70	1.70	1.80	1.90
Shapes, Pittsburgh	1.60	1.65	1.65	1.65
Shapes, Philadelphia	1.76	1.76	1.78	1.66
Shapes, Chicago	1.70	1.70	1.80	1.75
Tank plates, Pittsburgh	1.60	1.65	1.65	1.65
Tank plates, Philadelphia	1.80½	1.85½	1.85½	1.85½
Tank plates, Chicago	1.70	1.70	1.80	1.75
Sheets, No. 10 blue anneal., Pitts.	1.85	1.85	1.85	2.00
†Sheets, No. 24, hot, ann., Pitts.	2.40	2.15	2.25	2.55
Sheets, No. 24, galvan., Pitts.	2.90	2.80	2.85	3.15
Sheets, No. 10 blue anneal., Chi.	2.00	2.00	2.05	2.15
†Sheets, No. 24, hot, ann., Chi.	2.55	2.40	2.45	2.70
Sheets, No. 24 galvan., Chi.	3.00	2.95	3.00	3.35
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	1.80	1.80	1.90	2.10
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25

†Comparisons are with old classification No. 24 black sheets.

SCRAP				
Heavy melting steel, Pitts.	10.50	10.30	12.50	14.90
Heavy melting steel, eastern Pa.	8.00	8.75	10.00	12.50
Heavy melting steel, Chicago	8.50	8.50	9.60	12.00
No. 1 wrought, eastern Pa.	10.00	10.00	11.00	14.25
No. 1 wrought, Chicago	8.25	8.25	8.80	11.25
Rails for rolling, Chicago	10.50	10.90	11.85	14.50

Sheets

Small Volume of Orders Placed at New Prices — Some Consumers Are Stocking Up

SHEET PRICES, PAGE 71

Pittsburgh—Sheet mills are receiving some business at the new prices but most consumers covered requirements a short time ahead and the market is being provided little test. Producers apparently are determined to adhere to the new price schedule. Prices quoted are 2.40c for hot rolled annealed sheets; 2.90c for galvanized; 1.85c for blue annealed, and 3.10c for autobody. Mill operations have gained slightly at some points as a result of the heavier specifications received at the end of the second quarter, although output for the industry is only slightly above 35 per cent. Requirements of most leading consumers, particularly the automotive industry, are expected to decline to a new low level this month. A number of manufacturing plants have taken or are scheduled to take vacations during July but this is likely to react to the benefit of the mills in August

New York—Sheet business is light. Most buyers have covered through July and a real test of the new prices is not expected much before Aug. 1. Some buyers are reported to have stocks for beyond July, including shipments specified for delivery this month. Bids went in last week on several hundred tons for navy yards, Morris, Wheeler & Co. Inc., Philadelphia, being low on the bulk of the business.

Cincinnati—Sheet mill operations here continue at 40 to 50 per cent. Less than the expected reaction in business followed the earlier rush for contracts at former prices.

Philadelphia — Despite the fact most sheet consumers have covered to the end of July, several have inquired for round tonnages mainly for shipment in August. Thus far mills generally are quoting the new prices, and the next two weeks undoubtedly will afford a test.

Chicago — Sheet mill operations hold up well considering light individual orders. The district's rate is up slightly to about 50 per cent. Carloads and less comprise business, which largely is of urgent nature. Sales at the new prices of 2.50c, mills, for No. 24 hot rolled annealed, and 3.00c, mills, for galvanized, have helped establish these quotations for third quarter. Miscellaneous manufacturing and novelty business is most active.

Youngstown, O.—With 50 independent sheet mill units active, of 120, or slightly more than 41 per cent of capacity, production shows a slight expansion. Sufficient specifications are in hand to insure operations of some mills for two more weeks. Deliveries on old contracts must end by July 31. New prices are being applied by valley mills on new business, the volume of which is light. Mill managers believe the new schedules will go into general use without the usual price battle.

Cleveland—Despite the firm establishment of the newly adopted price clasification on steel sheets little business is developing. Mills generally have good backlogs, due in large part to customers' late June specifying for immediate shipment. The Fisher Body Co. here is working four days and four nights weekly, assembled 20,000 units last week and is working on a proposed 75,000-unit month for July. This is largely Chevrolet body work. Customers shop around. Even takers of primes in former years now specify seconds only.

Navy Awards Tubing

Washington—Recent awards for the naval aircraft factory, Philadelphia, include steel tubing to the Ohio Seamless Tube Co., Shelby, O., bids on which were opened June 18. Seamless copper tubing, bids June 18, went to Revere Copper & Brass Co. Inc., Baltimore.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

HOT ROLLED No. 10

Pittsburgh base	1.70c
Gary, Ind. Harbor, base	1.80c
Chicago, del.	1.85c
Philadelphia, del.	1.99c
Birmingham, base	1.85c
St. Louis, del.	2.60½c

BLUE ANNEALED No. 9-10

Pittsburgh, base	1.85c
Chicago, district mills	1.95c
Chicago, delivered	2.00c
Philadelphia, del.	2.14c
St. Louis, delivered	2.20½c
Birmingham	2.00c to 2.05c
San Francisco, c.i.f.	2.50c

HOT ROLLED ANNEALED No. 24

Pittsburgh, base	2.40c
Gary, Ind. Harbor, base	2.50c
Chicago, del.	2.55c
Philadelphia, del.	2.69c
Birmingham, base	2.55c
St. Louis, del.	2.75½c

GALVANIZED No. 24

Pittsburgh, base	2.90c
Gary, Ind. Harbor, base	3.00c
Chicago, del.	3.05c
Philadelphia, base	3.19c
Birmingham, base	3.05c
St. Louis, del.	3.25½c

AUTOMOBILE No. 20

Pittsburgh, base	3.10c

FURNITURE

Pitts., No. 10 heavy	2.75c
Pitts., No. 20 light	3.35c

TIN MILL BLACK No. 28

Pittsburgh, base	2.55c to 2.65c
Gary base	2.65c to 2.75c
St. Louis, del.	2.90½c

HEAVY COLD ROLLED No. 10

Pittsburgh base	2.35c
Gary, Ind. Harbor, base	2.45c
Chicago, del.	2.50c
Philadelphia, del.	2.64c
St. Louis, del.	2.70½c

COLD ROLLED No. 20

Pittsburgh, base	2.95c
Gary, Ind. Harbor, base	3.05c
Chicago, del.	3.10c
Philadelphia, del.	3.24c
St. Louis, del.	3.30½c

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00
Gary, Ind., base 10 cents higher.	
Long ternes, 24, unassorted, lb.	3.15c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.80 and 1.90
Cement coated nails	1.80 and 1.90
Galvanized nails	3.80 and 3.90
(Per pound)	
Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
7/16-in. smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

Steel Plates

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.81½c to 1.85½c
New York, delivered	1.93c
Boston, delivered	2.05c
Chicago, base	1.70c to 1.80c
Cleveland, base, for railroads	1.65c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.80c to 1.85c
Coatesville, Pa., base	1.70c
Pacific Coast, c.i.f	2.00c
St. Louis, del.	1.95½c

Structural Shapes

Base, Pittsburgh	1.60c to 1.65c
Philadelphia, del.	1.71c to 1.76c
New York, del.	1.85½c to 1.90½c
Boston, del.	1.98½c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.78½c to 1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham base	1.80c to 1.85c
Pacific Coast, c.i.f.	2.05c to 2.15c

Bars

SOFT STEEL

Pittsburgh, base	1.60c to 1.65c
Chicago, base	1.70c
Birmingham base	1.80c to 1.85c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.05c
Cleveland, base, local del.	1.70c
Cleveland base, out. del.	1.65c
Philadelphia, del.	1.89c to 1.94c
New York, del.	1.98c
Boston, del.	2.05c
Pittsburgh, cold finish	1.85c
Pittsburgh, forg. qual.	1.90c

RAIL STEEL

Chicago Heights	1.60c
Eastern mills	1.50c to 1.55c
Pittsburgh	1.30c to 1.35c

IRON

Chicago, base	1.70c to 1.80c
New York, delivered	1.93c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.75c to 1.85c
Stock lengths, mill	1.60c to 1.65c
Chi., billet	1.60c to 1.80c
Chi., rail steel	1.50c to 1.65c
Chi., rail steel, bridge and culvert	1.65c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	7.00 to 7.50 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bars, 2.65c, mill

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10 Cr.	0.45
2300	1.50	51.00 Cr. spring	0.20
2500	2.25	6100 bars	1.20
3100	0.55	6100 Spring	0.95
3200	1.35	Cr., Ni., Van.	1.50
3300	3.80	Carbon Van.	0.95
3400	3.80	9250 (flats)	0.25
4100 .15 to .25 Mo.	0.50	9250 (rds.,sq.)	0.50
4600 .20 to .30 Mo.			

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.65c
Do, 6 1/16 to 24-in., Pitts.	1.65c
Hot strip, bands 6 in. and under, Chicago	1.75c to 1.80c
Do. 6 1/16 to 24 in.	1.65c to 1.70c
Cooperage hoop, Pitts.	1.70c to 1.80c
Do, Chicago	1.90c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.15c to 2.25c
Worcester, 3 tons, over	2.40c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 20 to 45 lbs.	$22.00 to $26.00
50 to 75	20.00 to 24.00
80 to 100	24.00 to 27.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.70c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.70c
Spikes boat, barge, Pitts.	2.90c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 and 10 off

Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.

Eagle list ..... 73 and 10 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 and 10 off

Tire bolts, 60, 10 and 10 off.

Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.

Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 and 10 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off

Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off

Upset 1 in. and smaller ..... 80-10-5 off

Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l. Pittsburgh 2.50c

Do, less carloads, 5 kegs or over, 2.75c; less than 5 kegs 2.90c.

Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Mills Seek to Stabilize Market at 1.60c, Pittsburgh, as Absolute Minimum

BAR PRICES, PAGE 71

Cleveland — Sellers are making more generally a flat 1.70c, Cleveland base, plus 2½-cent extra. In a measure this constitutes an advance, as bars were heretofore 1.70c, delivered, or thus figuring back to 1.67½c, Cleveland local base. The 1.65c, Cleveland base, outside delivery, is holding though entrance of an outside mill into the Detroit district recently naming a 1.75c, delivered Detroit price, may logically be expected to have some effect on the Cleveland bar base for outside delivery.

Philadelphia—Contracting for steel bars has been practically concluded for third quarter with prices at 1.60c to 1.65c, Pittsburgh. Current specifications show no improvement from the recent level but, on the other hand, they have lost nothing in volume.

Pittsburgh — Steel bar demand shows only a slight decrease since the first of the month, but reflects reduced requirements for automotive purposes. Sellers anticipate no increase in activity for another 30 days. Orders call for minimum lots and there is no inclination to anticipate future needs. Contracting has been fairly active with 1.65c, Pittsburgh, the usual market. On current business this figure applies to the general buyer, with 1.60c for tonnage orders.

Youngstown, O.—Some steel bar users who have overstayed the July 1 limit for receipt of specifications on steel bars for delivery in July at former prices now are attempting vainly to cover but find that 1.65c, Pittsburgh, is holding firmly. The July 1 movement brought in considerable common bar specifications, sufficient to keep mills here operating around 40 per cent for probably a week or ten days further. Alloy steel bar output has diminished gradually in line with the falling off in automotive production.

Chicago—Bars for road and bridge fabrication in states where billet bars are specified are being sold at delivered quotations as much as $2 a ton below the Chicago base of 1.70c for commercial bars. Public bids disclose 1.60c, Chicago, for road and bridge bars in this territory. It is stated that fabricators are able to use shorter cut stock lengths for some of the competitive public work for which they are willing to quote lower delivered prices. Bar mills are down to about 35 per cent. Cold-finished bars for automotive work are slow despite more activity from a maker of a new low-priced car, and heavier production by a western automotive builder with a new line of cars. Hopes are expressed for moderate resumption of implement production in October. Sales of bars, plates and shapes are averaging up to the last four to six weeks.

Cold-Finished Activity Touches Low Point

Cold Finished Prices, Page 71

Pittsburgh—Shipments of cold-finished steel bars are declining and July movement is expected to be the smallest of 1931. New business is quiet, a portion of it being for August shipment. The market remains 2.10c.

Cleveland—Cold-finished steel bar activity is particularly slow without marked support from any one consuming industry. Orders are characterized by their small size. The 2.10c, Cleveland, figure is quotable.

Plates

Good Tonnages Placed and Pending—Cleveland Made Basing Point on Plates for Carriers

PLATE PRICES, PAGE 71

Chicago—No marked pick-up has occurred in fresh orders since the beginning of the month. Pipe line shipments are expected to taper in the next week. Production of 2000 tons for the Phoenix Utility Co. and several othe recent projects is being completed in this territory. Contract buying of plates for tank and pipe line work is slow, the base price being 1.70c, Chicago. About 3000 tons additional for oil tanks in Oklahoma City territory have been closed in two lots, and inquiries for 5000 tons of tank work are developing. Nine hundred tons are on inquiry for repairs on two lake freighters. Plate mills at 40 to 50 per cent operations are leading finishing mills, except sheets. About 3000 tons of piling and plates have been let for Milwaukee harbor development.

Philadelphia—Eastern plate mills are operating at 30 to 40 per cent of finishing capacity, with the tendency slightly downward. The market is 1.70c to 1.75c, base, Coatesville, Pa., although 1.70c is done somewhat more frequently, and some 1.75c contracts are being revised to 1.70c.

New York—Plates continue 1.70c to 1.75c, mill, the former applying to attractive business, although 1.75c still covers ordinary volume. Demand holds fairly well. Tank shops are operating 40 to 50 per cent. Little new tonnage is coming out for shipbuilding. It is possible new bids may be taken on a water line for the Paterson, N. J., interest. If steel finally is adopted approximately 5000 tons of 45 and 52-inch pipe will be required. About 2100 tons for a water line, department of water supply, gas and electricity, Bronx, New York, has been placed.

Bids are in on approximately 2500 tons for east and west yards, navy department, a Baltimore bid being low. For the navy yard, Norfolk, Va., bids close July 21 on 1406 tons of steel plate.

Pittsburgh — Plate continue to move slowly, new business in fabricated material continuing light. Car builders are poor buyers and the barge market is lacking in new business. Pending work is fair, but awards are slow. No improvement is noted in requirements of pipemakers. Plates usually are 1.65c, Pittsburgh.

Cleveland—Cleveland has been made a basing point for plates for railroad work, the current price being 1.65c, base, Cleveland, $1 a ton above the Pittsburgh level.

Mills receive small orders in occasional flurries. Bedford, O., plans building a 500,000-gallon steel storage tank, taking an unstated tonnage of plates. Local contractor award of steel plates for the Belvoir boulevard 54-inch main, requiring 2500 tons, is likely to be held up, due to the city council's reported preference for a local mill's product. Toledo, O., has received bids for 300 tons of sheet piling for the Bayview mooring basin, with Toledo Dredge & Dock Co., Toledo, O., low.

Contracts Placed

8000 tons, plates, shapes, bars and sheets, mostly plates, two gas holders, 4000 tons each, Philadelphia, for Philadelphia Gas Works; one, waterless holder, to Bartlett-Hayward Co.; the other, regulation holder, to McClintic-

Marshall Corp., Bethlehem, Pa.
3000 tons, plates and sheet piling for Milwaukee harbor development, to an unstated mill.
1000 tons, 30 and 36-inch welded steel pipe, Salt Lake City, Utah, to unnamed interest. General contract to Morrison-Knudsen Co.
300 tons, floating derricks for Mare Island navy yard, Mare Island, Calif., to unnamed interest.

Contracts Pending

6000 tons, plates, shapes and bars, 11 destroyers for United States government; plans to builders July 15.
2500 tons, repairs to two lake freighters for Pittsburgh Steamship Co., Pittsburgh.
2500 tons, east and west yards, navy department, bids July 7; John T. Hill, Baltimore, low on bulk of inquiry.
1406 tons, navy department, for Norfolk, Va.; bids, July 21.
300 tons, sheet piling, Bayview mooring basin, Toledo, O., to Carnegie Steel Co., Pittsburgh. Printed in error July 9 as 300 tons for Cleveland.
100 tons, barge, United States engineer, Wilmington, N. C., general contract to Charleston Dry Dock & Machine Co., Charleston, S. C.

Semifinished Steel Shipments Are Reduced

Semifinished Prices, Page 82

Pittsburgh—Sales of semifinished steel are confined to small lots and most users show little interest in contracting for the quarter. Prices usually are $29 for rerolling billets, slabs and sheet bars, with forging billets continuing $35 to $36, and wire rods $35. Shipments are light and smaller than a month ago.

Philadelphia—Billet sales are noted at $29 to $30, base, Pittsburgh, for rerollers, and $34 to $35 for forging quality.

Youngstown, O.—Two additional open hearth furnaces have been added this week to the active list by independent steelmakers in this district, making a total of 20 units operating, of the district's independent total of 51. The additional steel output is needed for skelp. Sheet bars continue in irregular demand. Strip needs are tapering, calling for fewer billets. Rerolling billets, slabs and sheet bars bring $29, Youngstown and Cleveland.

Cleveland—The market for sheet bars, billets and slabs is quieter, though the leading merchant producer here continues to operate five of its 14 open hearths. Prices of all three grades hold at $29, base, Cleveland and Youngstown, O.

Chicago—Stocks of semifinished steel, except sheet bars, are negligible. Moderately heavy stocks of sheet bars have been accumulated in the last few weeks. Sheet bars remain unchanged at $30, Chicago, while forging billets are $35 to $36.

Railroads

Norfolk & Western Buys 20,000 Tons Rails—Slight Gains in Car Buying—Chicago Mills Slower

TRACK MATERIAL PRICES, PAGE 71

New York — Car buying, while light, is slightly improved. Chicago has placed 400 tunnel car underframes and a coal company is reported to have bought 400 mine cars. Bids are in on track and contact rails for seven subway sections, New York. These are for 106, sections 1 and 7, inclusive. Vulcan Rail & Construction Co. has the contract for the installation of turnstile equipment on the new city owned system.

Norfolk & Western has placed 20,000 tons of rails, 15,000 tons going to Carnegie Steel Co. and 5000 tons to Bethlehem Steel Co. The same railroad has closed on third quarter needs of locomotive steel tires.

Domestic freight car awards in June involved 1910 cars. This is the third largest total so far in 1931, and compares with 20 cars in the preceding month, probably the poorest total on record. Total for the first half is 7044 units, a particularly poor showing compared with 32,604 in the corresponding period of 1930. Further comparisons follow:

	1931	1930	1929	1928
Jan.	100	5,072	13,196	4,160
Feb.	50	17,027	15,944	10,220
March	2,166	6,118	12,023	2,958
April	2,798	1,997	8,205	6,043
May	20	1,392	7,562	2,531
June	1,910	998	5,886	2,422
July	.....	1,389	341	582
Aug.	.....	1,111	2,854	677
Sept.	.....	576	4,517	1,378
Oct.	.....	4,116	19,506	2,853
Nov.	.....	2,621	6,361	6,140
Dec.	.....	2,729	9,710	4,799
Total	7,044	45,146	106,105	44,763

Cleveland—Occasional fill-in tonnages for spikes and other rail accessories have not developed into any consequence. Secondary rail commitments for 1931 are universally absent and car purchasing is of like character.

Chicago—Moderate rail releases continue on spring programs. About 2000 to 3000 tons have been ordered out during the week, and track fastenings specifications total 3000 to 4000 tons. Several thousand tons of finished steel have reached the mills for the 800 refrigerator cars being built by Fruit Growers' Express, and various repair jobs. Rail mill operations again have dropped about 5 points, schedules being at 25 to 30 per cent for the district.

Birmingham, Ala. — Tennessee Coal, Iron & Railroad Co.'s Ensley works will suspend operations indefinitely July 22. Action will affect approximately 800 workmen.

Car Orders Placed

Chicago, 400 tunnel car underframes, to Pressed Steel Car Co., New York.
Compania Chilena de Electricidad of Santiago, Chile, 30 street electric railway cars to J. G. Brill Co., Philadelphia.
Consolidation Coal Co., New York, 400 mine cars to Bethlehem Steel Co., Bethlehem, Pa.
Missouri Pacific, two 75-foot gas-electric rail motor cars, to St. Louis Car Co., St. Louis; 400-horsepower electric plants by Electro-Motive Co.
Navy department, six helium tank cars for Lakehurst, N. J., to General American Tank Corp., Chicago, previously reported as being low.

Locomotives Placed

Standard Fruit Railroad Co., La Ceiba, Honduras, one 2-8-0 type locomotive to American Locomotive Co., New York, through Equitable Equipment Co. Inc.

Rail Orders Placed

Norfolk & Western, 20,000 tons 130-pound sections, allocated as follows: Carnegie Steel Co., Pittsburgh, 15,000 tons and Bethlehem Steel Co., Bethlehem, Pa., 5000 tons; bids opened July 8.

Steel Backlog 4 Per Cent Less than May's Figure

Though tonnage on the books of the United States Steel Corp., as of June 30—3,479,323 tons—was the smallest of any month in 1931, the decline from May was less than expected in most quarters. Net decrease was 141,129 tons or 3.89 per cent. June represents the third successive monthly decline but this is in keeping with the trend in the corresponding months of 1930. Monthly comparisons follow:

1930			
Jan. 31	4,468,710	51,517+	1.20+
Feb. 28	4,479,748	11,038+	0.25+
Mar. 31	4,570,653	90,905+	2.03+
April 30	4,354.220	216,433—	4.73—
May 31	4,059,227	294,993—	6.78—
June 30	3,968,064	91,163—	2.24—
July 31	4,022.055	53,991+	1.36+
Aug. 31	3.580,204	441,851—	10.9 —
Sept. 30	3,424,338	155,866—	4.35—
Oct. 31	3,481,763	57,425+	1.68+
Nov. 30	3,639,636	157 873+	4.53+
Dec. 31	3,943,596	303,960+	8.35+
1931			
Jan. 31	4,132,351	188,755+	4.78+
Feb. 28	3,965,194	167,157—	4.04—
Mar. 31	3 995.330	30.136+	0.73+
Apr. 30	3,897,729	97.601—	2.24—
May 31	3.620.452	277,277—	7.11—
June 30	3,479,323	141,129—	3.89—

Structural Shapes

Golden Gate Bridge Award Deferred — 15,000-Ton Parcel Post Building Up— Awards More Numerous But Total Dwindles — Week's Fresh Pending, 35,564 Tons

STRUCTURAL SHAPE PRICES, PAGE 71

New York—Bids go in Aug. 20 on the 6 and 9-story parcel post building, New York, which will take about 15,000 tons. Four bridges, two at Pittsburgh, Chicago and Lancaster, Pa., are included in the contract to be opened by the Pennsylvania railroad, July 21. Action on the Shelter Island sound bridges may be delayed, substructure openings having been postponed one month until about Aug. 15. Foundation bids on the second section, west side elevated highway to have opened this week, have been postponed to July 23. A department building at Washington takes 1000 tons, bids July 31.

Lettings are slightly more numerous. Plain material prices are steady, but fabricated prices are still covering wide ranges. Navy department has bids on more than 800 tons for navy yards on which the two largest producers are low. Pennsylvania railroad will fabricate 1400 tons for electrification work in its Altoona shops. A Providence, R. I., courthouse, 810 tons, was placed.

Boston—Over 1000 tons of structurals were awarded in the past week, but only about 700 tons are pending. Largest award was for 825 tons, which went to the Lehigh Structural Steel Co., for an addition to the courthouse, Providence, R. I. Two dormitories, Harvard university, took 250 tons.

Philadelphia—Eastern shape mills have advanced and 1.70c, base eastern mill, is now the minimum on plain standard shapes. Shape mills are operating at about 38 per cent of capacity.

Pittsburgh—Inquiry is spotty, recently having spurted following a period of poor business. Most inquiry is for only small lots and activity in this district is quiet. Interest is centered on the South Tenth street bridge here requiring 4300 tons, on which bids close July 21.

Cleveland—Structural inquiry is particularly depressed with new jobs sparse. The 1000 tons in the Juvenile courts group is pending though 200 tons for the Warrensville, O., hospital has been placed.

Chicago—About 6000 to 7000 tons of public work has been let. Mills are operating 35 to 40 per cent, and the base price for plain material remains at 1.70c, Chicago, despite some recent concessions in bordering competitive territory. About 1500 tons may be purchased for the Cook county nurses' home addition in Chicago, the distribution between structural shapes and concrete awards being undetermined. Car shops ordered out about 3000 tons of structural and plate material during the week. From 3000 to 5000 tons will be purchased for the Milwaukee sewage treatment works.

A number of projects are being postponed because of necessary readvertising to comply with a new state law's specifications on wages and the 8-hour day. About 50 jobs of 100 to 200 tons each are out in this district.

Birmingham, Ala.—Fabricating shops are averaging four days a week. Several small contracts have been booked.

San Francisco—Definite award of the 106,000 tons of structural steel and cable for the Golden Gate bridge has been delayed until bonds for the structure are sold. Only one financial institution bid and this was not in accordance with specifications. Low bidders on the steelwork were ratified at a meeting of the building committee, July 8.

Contracts Placed

6100 tons, grade elimination, route 25, connecting link section 1, New Jersey state highways, to McClintic-Marshall Corp., Bethlehem, Pa.

2865 tons, telephone building, Indianapolis, to Central States Bridge & Structural Co., Indianapolis.

1400 tons, Pennsylvania railroad, miscellaneous materials for electrification work, to be fabricated in railroad's own shops, Altoona, Pa.

1110 tons, columns for Illinois Terminal warehouse, St. Louis, to Missouri Rolling Mill Corp., St. Louis.

850 tons, 7-story building, Syracuse Lighting Co., Syracuse, N. Y., to Lackawanna Steel Construction Corp., Buffalo; J. D. Taylor Construction Co., Syracuse, general contractor.

825 tons, court house, Providence, R. I., to Lehigh Structural Steel Co., Allentown, Pa.

800 tons, Northern Pacific railroad bridge, across Duwamish river, Seattle, to Wallace Bridge & Structural Steel Co., Seattle.

725 tons, building, board of education, Lower Merion township, Ardmore, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.; McCabe Bros., Cynwyd, Pa., contractors.

645 tons, 6-story church, Madison avenue and Sixtieth street, New York, to George A. Just Co., Brooklyn, N. Y.; Hegeman - Harris Co., contractor; Cram & Ferguson, architects.

560 tons, building, Jamaica, Long Island, for Harriman Building Corp., to Bershire Structural Steel Co., Brooklyn, N. Y.

500 tons, administration building, Hackensack, N. J., to F. G. Schaefer Iron Works, Edgewater, N. J.

450 tons, 300 car underframes for Pacific Fruit Express Co., San Francisco, to Pacific Coast Engineering Co., Oakland, Calif.

450 tons, Princess Hotel unit, Bermuda, to Belmont Iron Works, Philadelphia, through John W. Ferguson, Paterson, N. J., and New York; previously reported as going to unstated fabricator.

440 tons, shapes and bars, bridge over Broad river, Cherokee county, S. C., to Dewey Bros., Goldsboro, S. C.

430 tons, buildings, divinity school, Yale university, New Haven, Conn., to American Bridge Co., Pittsburgh; Sperry & Treat Co., New Haven, contractors.

425 tons, grillages, Thirtieth street yards, New York, for New York Central railroad, to American Bridge Co., Pittsburgh.

425 tons, floor for bridge, Prairie du Chien, Wis., to American Bridge Co., Pittsburgh.

400 tons, addition public school 117, Jamaica, N. Y., to Bethlehem Fabricators Inc., Bethlehem, Pa.; Grace & Castagne Co., contractor.

385 tons, bridge, Woodlawn, N. Y., for New York Central railroad, to Harris Structural Steel Co., New York.

373 tons, dormitory, Yale university, New Haven, Conn., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

350 tons, grade crossing elimination, Detroit, for Michigan Central railroad, to American Bridge Co., Pittsburgh.

340 tons, bridge, Manitou, N. Y., to Pittsburgh Bridge & Iron Co., Rochester, Pa.

340 tons, bridge, Wantagh Spur parkway under Long Island railroad tracks, Long Island state park commission, New York, to Fort Pitt Bridge Works, Pittsburgh; Foley Bros., New York, contractor.

315 tons, highway bridge, Herkimer county, New York, to American Bridge Co., Pittsburgh.

305 tons, highway bridge, Minnesota highway commission to American Bridge Co., Pittsburgh, and Minneapolis-Moline Power Implement Co., Minneapolis.

300 tons, Masonic temple, Johnstown, Pa., to Griffith-Custer Steel Co., Johnstown.

280 tons, quadrangle building, High and Library streets, New Haven, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.

250 tons, Harvard university dormitories, Cambridge, Mass., to New Eng-

Awards Compared

	Tons
Awards this week	23,000
Awards last week	32,108
Awards two weeks ago	29,199
Awards this week in 1930	56,757
Av. weekly awards, 1930	35,242
Av. weekly awards, 1931	36,225
Av. weekly awards, June	38,076
Total awards to date, 1930	1,008,470
Total awards to date, 1931	1,086,754

land Structural Co., Boston.

250 tons, 4-story plant, Bogart street, Brooklyn, N. Y., to Gaynor & Rosenblum, Brooklyn.

225 tons, grade crossing, Lehigh Valley railroad, Decker Crossing, Schuyler county, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, chronic hospital, Warrensville, O., to unstated fabricator, through Sam Emerson, Cleveland, contractor.

200 tons, school, Our Lady of Lourdes, Queens Village, N. Y., to George A. Just Co., Brooklyn, N. Y.; I. Hopper Co., contractor.

175 tons, 180-foot truss bridge, Cold Springs, Minn., to Minneapolis-Moline Power Implement Co., Minneapolis.

150 tons, apartment, Market and Laguna streets, San Francisco, to Herrick Iron Works, Oakland, Calif.

150 tons, highway bridge, St. Lawrence county, New York, to American Bridge Co., Pittsburgh.

150 tons, school, Verona, N. J., to Globe Iron Works, Bayonne, N. J.

145 tons, electrification foundations, Washington, for Pennsylvania railroad, to Shoemaker Bridge Co., Pottstown, Pa.

145 tons, apartment, 149th street, Jamaica, N. Y., to G. M. Iron Works, Brooklyn, N. Y.

142 tons, bridge, to carry route 2, section 6, over route 4, Paramus, N. J., to Belmont Iron Works, Philadelphia; 72 tons concrete reinforcing bars to McClintic-Marshall Corp., Bethlehem, Pa., Anderson Construction Co., Staten Island, N. Y., contractor. State of New Jersey project.

110 tons, grade crossing elimination, North Lincoln avenue, Elberon, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

100 tons, plant addition, Oliver Gear & Machinery Corp., Buffalo, to Structural Steel Co., Buffalo.

100 tons, school, Wayne, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

Contracts Pending

15,000 tons, 6 and 9-story parcel post building, United States postoffice department, block bounded by Ninth and Tenth avenues between Twenty-ninth and Thirtieth streets, New York; bids Aug. 20 on superstructure. Foundations nearing completion.

6700 tons, two bridges, Shelter island sound, Long Island, N. Y.; bids on superstructures postponed to about Aug. 15.

2500 tons, federal building, Seattle.

1000 tons, office building, United States department of health, Washington; bids July 31.

1200 tons, postoffice, Little Rock, Ark.

860 tons, postoffice, Salt Lake City, Utah; sub-bids being taken on structural steel.

848 tons, navy department, equally divided between Brooklyn, N. Y., Philadelphia, Mare Island, Calif., and Puget Sound, Wash.; bids in July 2. Bethlehem Steel Co., Bethlehem, Pa., and Carnegie Steel Co., Pittsburgh, both low on two eastern yard requirements, Carnegie Steel Co. low on Pacific Coast needs.

800 tons, postoffice, South Bend, Ind.

550 tons, highway bridges, Minnesota.

500 tons, additions, post office, Houston, Tex.; Robert E. McKee, El Paso, Tex., contractor.

500 tons, shapes, angles and channels, eastern and western yards, navy department, Washington; bids in July 7.

500 tons, Medical Arts building, Topeka, Kans.

450 tons, Calumet sewage treatment works, Chicago; bids being readvertised.

450 tons, building for Wilshire Income Properties Co., Los Angeles; bids being taken.

400 tons, highway bridge, Columbus, Nebr.

400 tons, viaduct for Chicago, Burlington & Quincy railroad, Galesburg, Ill.

400 tons, bridge, Gun Powder Falls, Baltimore; bids taken.

300 tons, highway bridge, Reedstown, Wis.

300 tons, postoffice, Las Vegas, N. Mex.

290 tons, standpipe, Rockport, Mass.

250 tons, high school, Ottawa, Ill.

210 tons, bridges, route 2, section 6, Maywood and Rochelle Park, N. J.; bids July 27, New Jersey state highway commission, Trenton, N. J.; A. Lee Grover, chief clerk.

200 tons, Medical Arts building, Harrisburgh, Pa.

200 tons, Canton-Dedham, Mass., state bridge.

186 tons, angles and channels, navy department for Norfolk, Va.; bids July 21.

185 tons, section 1, division 2, west side elevated highway, New York; bids to have been taken July 13 postponed to July 23.

150 tons, high school, Park Ridge, Ill.

125 tons, Boston elevated railway station, Charles and Cambridge streets, Boston.

100 tons, standpipe, Weymouth, Mass.

Unstated tonnage, bridge over Restigouche river, Cross Point, Que., connecting with New Brunswick; arrangements have been completed between provincial governments of Quebec and New Brunswick; work to begin this year.

Unstated tonnage, Pennsylvania railroad, bridges, Ashland avenue, Chicago; Lititz Pike, Lancaster, Pa., and two bridges, Stueben and Main streets, West End, Pittsburgh; bids July 21.

Concrete Bars

Billet Bars Price Off Sharply in Large Sales—Awards, Led by 1200-Ton Hospital, Only Average—Illinois Cancels Large Letting—Memphis Job to Take 1500 Tons

REINFORCING BAR PRICES, PAGE 71

Chicago—Billet bar prices for public work, including bridge work in the north central states where billet bars are specified, have dropped sharply. Bids on 600 tons for the overhead bridges in Wisconsin reveal delivered prices ranging at 2.15c to 2.37c, with a freight rate of 22 cents to 25 cents from Chicago. The prices include extras for bending, spacers and bar seats. Eastern prices on this work thus figure about 1.30c, Pittsburgh, while some Chicago prices figure as low as 1.60c to 1.65c, Chicago. Illinois highway commission has canceled the $2,500,000 road contract letting scheduled for July 15, and will readvertise for bids on specifications revised to comply with the new 8-hour day and prevailing wage scale law.

New York — Inquiry is slightly heavier. About 1000 tons of new business is up for New Jersey highways and bridges, while about the same volume pends on which general contracts have been placed. Bids closed this week on about 1500 tons for a sewage disposal plant, Elizabeth, N. J. Action will be delayed on 600 tons for the Shelter Island sound bridges, substructure bids having been postponed one month. Sewers in three New York city boroughs on which bids are in will take about 1000 tons. Prices are firm at 1.93c, New York, large tonnages, and 1.98c on small orders, there being less shading.

Awards Compared

	Tons
Awards this week	**5,464**
Awards last week	**5,135**
Awards two weeks ago	**9,072**
Awards this week in 1930	**3,362**
Av. weekly awards, 1930	**6,990**
Av. weekly awards, 1931	**6,749**
Av. weekly awards, June	**6,506**
Total awards to date, 1930	**200,339**
Total awards to date, 1931	**202,495**

Contracts Placed

1200 tons, hospital for veterans bureau, United States government, Seattle, to Bethlehem Steel Co., Bethlehem, Pa., through N. P. Severin, Chicago, general contractor.

614 tons, sewage treatment plant, Phoenix, Ariz., to unstated interest.

600 tons, overhead bridges, Wisconsin, to several unstated fabricators.

450 tons, American Express Co. building, union terminal, Cincinnati, to Jones & Laughlin Steel Corp., Pittsburgh, through Ferro-Concrete Co., Cincinnati, general contractor.

390 tons, bars and wire mesh, state highway paving, Midland county, Mich., to Capitol Steel Corp., Lansing, Mich.; Whitlock & Holbeck, contractors.

375 tons, packing plant, Milwaukee, for Swift & Co., Chicago, to Olney J. Dean Co., Chicago.

350 tons, hotel, Phoenix, Ariz., to unstated interest.

300 tons, childrens' memorial hospital, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

300 tons, billet steel, Columbus road, Cuyahoga county (Cleveland), O., to

(*Concluded on Page* 79)

Strip

July Expected to Show New Low for Year—Advance Seems to Be Established—Production Low

STRIP PRICES, PAGE 71

Youngstown, O.—An unusual situation is developing with relation to hot and cold-rolled strip new business. Many small-lot purchases of both kinds of strip are being made on the new classification basis and at 1.65c, Pittsburgh, for narrow strip and 1.55c for wider; and 2.15c to 2.25c for cold-rolled. Hence, imperceptibly the new prices are slipping into the trade so that when the larger tonnages later come to be placed the new prices are expected to be found in full and unquestioned vogue.

Strip mills are slowing down due to diminished auto partsmakers' demands. Full turns are not being worked in valley mills this week, and further tapering is expected later.

New York—Cold-rolled strip is firm at 2.15c to 2.25c, Pittsburgh, with business largely confined to fill-in shipments. Most buyers are covered for the quarter. Hot-rolled is dull at 1.55c, Pittsburgh, for wide, and 1.65c, narrow.

Philadelphia — Cold-rolled strip continues at 2.15c, Pittsburgh, while wide hot-rolled is 1.55c and narrow 1.65c, Pittsburgh.

Pittsburgh — Declining requirements of automotive interests and plant shutdowns by other consumers are expected to reduce strip shipments this month to a new low for the year. Orders call for minimum requirements and are spotty. Prices still lack a thorough test but the $1 a ton advance on hot strip appears to have been successful, based on the willingness with which consumers have signed new contracts. Hot strip is 1.55c and 1.65c with cold-rolled strip 2.15c to 2.25c. Mill operations continue irregular, averaging around 25 to 30 per cent for hot mills and 20 to 25 for cold strip.

Cleveland—Hot-rolled strip orders have shown a tendency to be even lower. The continued depressed condition, however, has not been without its encouraging factors for inquiry has increased, the new prices are being applied and give every indication of holding. The 1.55c price for hot-rolled wide and 1.65c, narrow, both Pittsburgh base, are well observed. Less-carload business is more general than commitments of larger proportions. Cold-rolled strip is quiet at 2.15c to 2.25c, Cleveland.

Watervliet Iron & Brass Foundry Inc., Watervliet, N. Y., has increased its capital from $25,000 to $27,000, for expansion purposes.

Operations Off Fractionally Due to Pittsburgh Decline

Youngstown, O. — Independents have added two open hearths to the active list, making a total of 20 units active out of a district total of 51, or a little less than 40 per cent active. Steel Corporation activities in the district are around 50 per cent or less. General activity is unchanged this week at 38 per cent. Finishing mill operations average 30 per cent of capacity because of a number of idle sheet and bar mill units.

	Per Cent
Operations this week	33
Operations last week	33-34
Operations two weeks ago	34-35
Operations this week, 1930	58-59
High for 1931, (March 19)	57
Low for 1931, (July 16)	33

Mahoning Valley Steel resumed on six sheet units at Niles after a week's idleness, but all Empire Steel units at Niles continue idle. Republic Steel has one-half its sheet capacity active at Niles, and Sheet & Tube about the same at its Campbell works.

Philadelphia—Eastern ingot operations are up one point this week to 33-34 per cent capacity. A large mill in this district has gained two points to 35 per cent operation.

Buffalo—Steelworks' operations show a one point increase this week, to 38 per cent of capacity, due to changes in two plants.

Pittsburgh—Changes in mill operations are slight. Ingot production is slightly lower at 30 to 35 against 34-35 per cent last week. Blast furnace schedules are unchanged at 14 active of 54 steelworks stacks. Tin plate output is unchanged at 65 with sheets slightly higher at better than 35. Strip and pipe are unchanged at 25 to 30 and 35 to 40 per cent, respectively.

Cleveland—Steel production is continuing engaged at 35 per cent of capacity, with each of the four mills' open-hearth schedules unchanged and a total of 12 of 34 open hearths in production. Finishing mill operations are intermittent. A local steelwork's foundries are operating at 30 per cent of capacity.

Chicago—Ingot output is unchanged at 30 per cent. Ten of the district's 36 steelworks blast furnaces are operating, a banked stack at Joliet works having been put in this week. The leading interest now has five of its 27 stacks active. Virtually all finishing mills have eased off, except plate and sheet mills.

Birmingham, Ala.—Ingot production continues at 40 per cent this week. Closing of Ensley works of Tennessee Coal, Iron & Railroad Co. rail mill, July 22, will cause cessation of five or six active open hearth furnaces, and operations in the district will fall to around 33 per cent.

Warehouse Sales Show But Slight Pickup after Holiday

Warehouse Prices, Page 93

New York—Volume is tapering, with indications July business will be under recent months. While several jobbers announce new prices on galvanized and black sheets, some, including one of the largest, still are holding off. Bolts and nuts are easy, with some foreign material selling close to mill prices.

Philadelphia—Jobbers report sales so far in 1931 are running 65 per cent of the same portion of 1930 and 45 per cent of the corresponding time of 1929. Prices are unchanged and firm.

Pittsburgh—Sales continue quiet but show small gains in some quarters, contrary to the decline usually experienced at this time. Prices lack strength, with machine bolts reduced to 70 and 10 off list.

Cleveland—Apathy continues to grip consumers of warehouse steel, with the result that orders are both smaller and fewer than even the retarded rate of June. Prices are maintained.

Detroit—Jobbing interests experienced a better sales volume over the week than that in the week preceding, which was interrupted by holiday influences.

Cincinnati—Quotations are unchanged, with no recognition so far of sheet reclassification. Business last week failed to offset holiday dullness.

St. Louis—Spottiness in business is reported by warehousemen, but the general average is somewhat above expectations and of seasonal size.

Concrete Bars Placed

(*Concluded from Page 75*)

Truscon Steel Co., Youngstown, O., through Lowensohn Construction Co., Cleveland, contractor.

260 tons, widening bridge over Santa Ana river, Riverside county, Calif., to unstated interest.

250 tons, reservoir, Hackensack, N. J., to Igoe Bros., Newark, N. J.

200 tons, track elevation work, Kenosha, Wis., for Chicago & North Western railroad, to American System of Reinforcing, Chicago.

150 tons, Pennsylvania state college buildings, State College, Pa., to Concrete Steel Co., Pittsburgh, through Henry E. Baton, contractor.

120 tons, sewer, Newark, N. J., to Truscon Steel Co., Youngstown, O., through J. L. Harrison, contractor.

110 tons, building, Syracuse Lighting Co., Syracuse, N. Y., to Kalman Steel Co., Chicago; J. D. Taylor Construction Co., Syracuse, general contractor.

105 tons, mesh, state highway, Berrien county, Mich., to Capitol Steel Corp., Lansing, Mich.

100 tons, City National Bank, Lansing, Mich., to Capitol Steel Corp., Lansing, Mich.

100 tons, *Pasadena Post* building, Pasadena, Calif., to unstated interest.

100 tons, office building, 2428 McPherson street, Los Angeles, to unstated interest.

100 tons, bridge over Coyote creek, Santa Clara county, Calif., to unstated interest.

100 tons or more, grain elevator, Spokane, for Farmers' National Grain Corp., to unstated interests through Alloway & Georg, general contractors, Spokane.

Contracts Pending

1500 tons, pumping station units and extensions, Memphis, Tenn.; bids Aug. 12-14.

900 tons, war memorial and opera house, San Francisco; sub-bids being taken.

500 tons, postoffice, South Bend, Ind.

475 tons, highway, route 35, section 8, Belmar to Brielle, N. J.; bids July 22, New Jersey state highway commission, Trenton, N. J.; A. Lee Grover, chief clerk. Work also includes 362 square yards 18-inch reinforced concrete slab, two small span stream bridges, one 68-foot span highway bridge and one 127-foot farm bridge.

350 tons, mesh, Gabriel-Starkey road, New York state; Vincent Schiavi, Buffalo, low.

275 tons, highway, route 6, section 2A, 3A and 1D, Abbott avenue to Christies lane and Grade avenue extension, Bergen county, N. J.; bids July 27, New Jersey state highway commission, Trenton, N. J.; A. Lee Grover, chief clerk.

265 tons, highway, route S-28, section 1, Weston's mill to Tanners' Corner, Middlesex county, N. J.; bids July 27, New Jersey state highway commission, Trenton, N. J.; A. Lee Grover, chief clerk. Work also includes two small span bridges.

210 tons, mesh, Seneca street—Orchard Park road, Buffalo; Charles D. Ream, Kenmore, N. Y., low.

200 tons, Thief River dam, near Baker, Oreg.; bids July 27 on general contract and on material later, bureau of reclamation.

154 tons, state highway bridgework in two counties, O.; Columbia and Lycoming counties, 83 tons; Jefferson county, 71 tons; Holmes Construction Co., Wooster, O., contractor.

150 tons, West Portal school, San Francisco; bids July 29.

140 tons, Van Ness avenue pier, San Francisco; sub-bids being taken.

130 tons, highway, Bedford and Poundridge, Westchester county, N. Y.; bids July 21.

125 tons, grade crossing, St. Louis, for St. Louis-San Francisco railway.

120 tons, additions, postoffice, Houston, Tex.; Robert E. McKee, El Paso, general contractor.

118 tons, highway work, San Diego county, Calif.; bids July 29.

115 tons, two bridges, route 2, section 6, Maywood and Rochelle Park, N. J.; bids July 27, New Jersey state highway commission, Trenton, N. J.; A. Lee Grover, chief clerk.

111 tons, Los Angeles county, Calif.; bids July 20.

110 tons, track stadium, University of California, Berkeley, Calif.; sub-bids being taken.

110 tons, shapes and bars, mostly bars, underpass and overpass, Bronx parkway extension, Yorktown, N. Y.; bids July 28, Westchester county park commission.

100 tons, hospital, Reno, Nev.; bids July 25.

100 tons, city hall, Hammond, Ind.; general contract to W. J. Holliday Co., Chicago.

100 tons, postoffice, Lafayette, Ind.

Pipe

Mill Backlogs Dwindling—10,000 Tons Seamless Up in East—Oil Country Activity Restricted

PIPE PRICES, PAGE 93

New York—Cast pipe lettings in this territory were about 3000 tons. Most of 8000 tons for a refinery at Port Jerome, France, on which several foundries bid, is expected to be bought abroad. Prices are weak, attractive lots going at $30 to $32, eastern foundry, and even lower.

Several hundred tons of welded steel pipe, steel tubing, iron and lapweld pipe for Philadelphia and eastern yards, navy department, have been bid.

Bids on the second division, West Side elevated highways, to have opened July 13 with the borough president, Manhattan, were postponed to July 23. This section will take close to 10,000 tons of seamless 18-inch steel pipe with ½-inch wall.

Pittsburgh—Approaching the end of the production of recent pipe line orders, mills see little opportunity for improved operations over the next four to six weeks unless several projects, pending for some time, materialize. Oil drilling activity is restricted in most districts and demand for oil country goods is correspondingly quiet.

Chicago—Water filtration and sewage treatment works provide the chief business for cast pressure pipe distributors. Delivered prices for 6 to 24-inch sizes are nominal at $42 to $44. Chicago sanitary district will require about 1000 tons of miscellaneous sizes for sewage treatment works and about 750 tons will be bought by Milwaukee. Culvert pipe is fairly active.

Cast Pipe Placed

1602 tons, 4 to 12-inch class 150, San Francisco; allocated as follows: to United States Pipe & Foundry Co., East Burlington, N. J., 886 tons of 8 and 12-inch and to National Cast Iron Pipe Co., Birmingham, Ala., 716 tons of 4 and 6-inch.

831 tons, 20 and 24-inch class 100 and 250, Vallejo, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

825 tons, 24-inch, Passaic Valley water commission, Paterson, N. J., to R. D. Wood & Co., Florence, N. J.; valves to Rennselaer Valve Co., Troy, N. Y.; Sanitary Engineering & Construction Co., Paterson, general contractor.

700 tons, 24-inch, for Barberton, O., to United States Pipe & Foundry Co., East Burlington, N. J.

465 tons, 20-inch, Manhattan (New York), department of water supply, gas and electricity, to Warren Foundry & Pipe Co., Philipsburg, N. J.; Beaver Construction Co., contractor.

430 tons, 6 to 12-inch, mostly 12-inch, class C, Kenmore, N. Y., to United States Pipe & Foundry Co., East Burlington, N. J.; W. W. Kimmins & Son, Kenmore, contractor.

350 tons, various sizes, sewer system, Barksdale field, Shreveport, La., to United States Pipe & Foundry Co., Birmingham, Ala.; Fargy-Hanson & McCorkle, Lake Charles, La., contractors.

225 tons, 20-inch with fittings, department of water supply, gas and electricity, Bronx (New York), to Warren Foundry & Pipe Co., Philipsburg, N. J.; A. Gregorio & Co., general contractor.

150 tons, various sizes, Nashua, N. H., to R. D. Wood & Co., Florence, N. J.

135 tons, 6 to 12-inch, Northampton, Mass., to R. D. Wood & Co., Florence, N. J.

125 tons, small sizes, Ridgewood, N. J., to Warren Foundry & Pipe Co., Philipsburg, N. J.

100 tons, various sizes, West Springfield, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

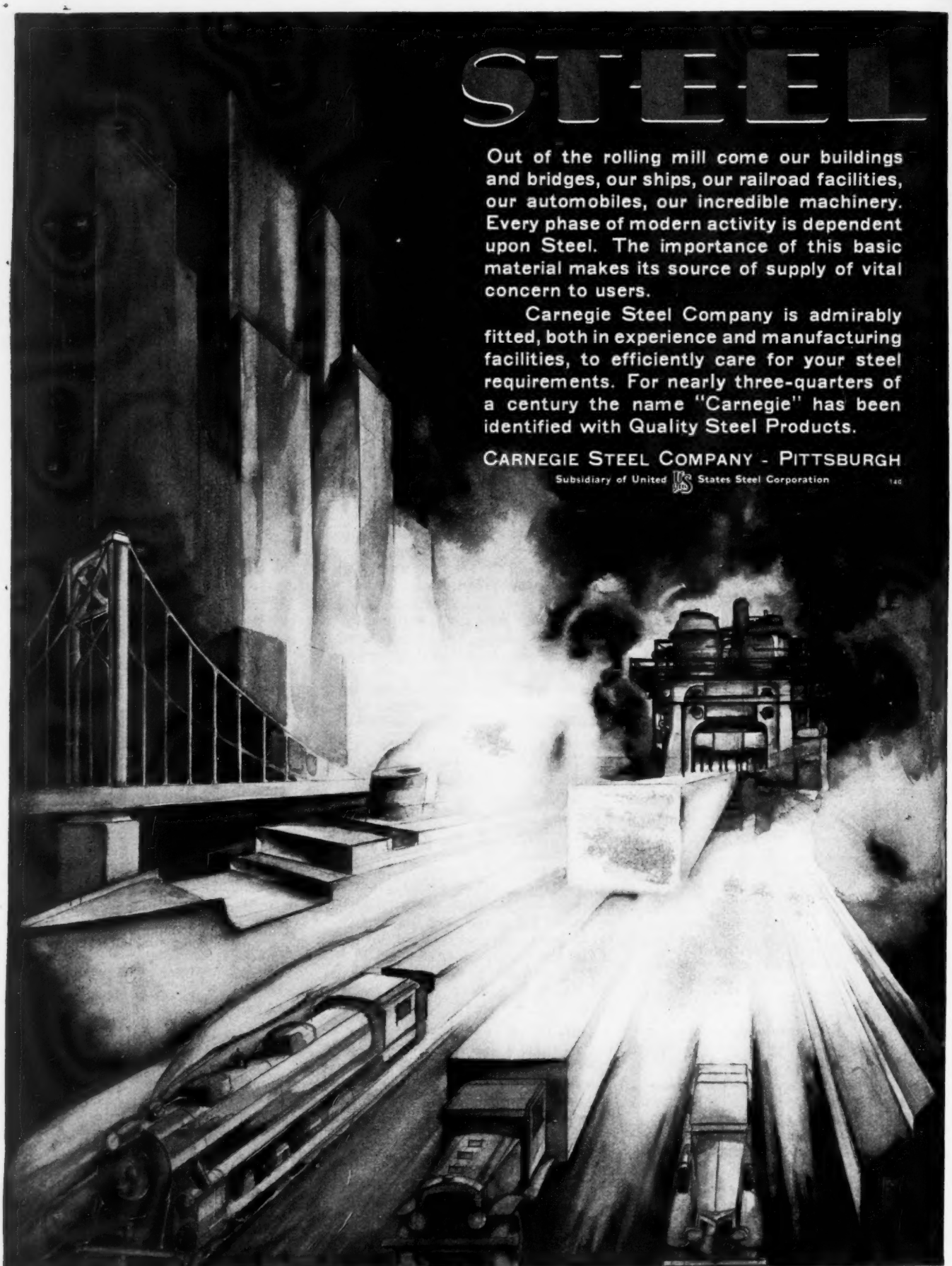
Steel Pipe Placed

2100 tons, 48-inch, water line, department of water supply, gas and electricity, Bronx, New York, to Petroleum Iron Works, Sharon, Pa.; A. Gregorio & Co., general contractor.

1000 tons, wrought steel pipe, and 10,000 to 20,000 boiler tubes, Delaware, Lackawanna & Western railroad, to unstated interests.

Cast Pipe Pending

2365 tons, 2 to 8-inch class B or 150, Oakland, Calif.; Pacific States Cast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Out of the rolling mill come our buildings and bridges, our ships, our railroad facilities, our automobiles, our incredible machinery. Every phase of modern activity is dependent upon Steel. The importance of this basic material makes its source of supply of vital concern to users.
Carnegie Steel Company is admirably fitted, both in experience and manufacturing facilities, to efficiently care for your steel requirements. For nearly three-quarters of a century the name "Carnegie" has been identified with Quality Steel Products.
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CARNEGIE

Iron Pipe Co, Provo, Utah, low.
1340 tons, 10 to 14-inch, Le Roy, N. Y., bids July 22.
1200 tons, various sizes, water line extensions and pumping station, Memphis, Tenn.; bids Aug. 12-14.
1000 tons, miscellaneous sizes, Chicago sanitary district sewage treatment works.
750 tons, 16-inch, class B, Oakland, Calif.; Grinnell Co., San Francisco, low.
750 tons, estimated, miscellaneous sizes, sewage treatment works, Milwaukee.
266 tons, 20 and 24-inch, class B or 150, Burbank, Calif.; bids opened.
150 tons, 14 to 24-inch, sewer, Mt. Pleasant, Westchester county, N. Y.; bids July 17.
150 tons, 3 to 10-inch, board of transportation, New York, for subway contract; bids in.
100 tons, 4 to 14-inch, Grove City, Pa.; bids in.

Steel Pipe Pending

10,000 tons, 18-inch seamless steel pipe, foundations with ramp approaches, West Side elevated highway, section 1, division 2, Twelfth avenue, Thirteenth avenue, Marginal street and Thomas Smith park from West Twenty-second street to West Thirty-eighth, New York, bids to have opened July 14 postponed to July 23, borough president, Manhattan, N. Y.

Iron Ore Movement Slow; New Demand Lacking

Iron Ore Prices, Page 82

Cleveland—The movement of Lake Superior iron ore continues slow. Consumers are taking shipments as indicated earlier in the season, but no additional requirements are developing. The Lake Superior Iron Ore association reports the following tonnages of ore received at and shipped from Lake Erie furnaces to July 1 this season:

Port	Receipts	Shipments	Dock balance July 1, 1931
Buffalo	201,917	6,573	3,469
Erie	67,295	71,552	54,642
Conneaut	837,386	1,091,236	1,534,457
Ashtabula	389,824	637,186	1,771,848
Fairport	196,272	253,013	342,409
Cleveland	769,820	620,383	992,635
Lorain	347,986	166,092	118,695
Huron	51,062	51 171	321,796
Toledo	115,719	119,152	16,741
Total	2,977,281	3,016,358	5,156,692
Comparative 1 year ago	9,751,797	8,122,255	4,612,638

Receipts at other than Lake Erie ports to July 1 follow:

Port	Tons
Detroit	284,966
Indiana Harbor	394,316
Gary	657,393
South Chicago (local fces.)	780,884
South Chicago (interior fces.)	21,545
Sault Ste. Marie, Ont.	39,928
Hamilton, Ont.	10,708
Total	2,189,740
Comparative 1 year ago	4,797,358

Wire

Firming of Prices Felt, but Test Is Not Complete—Production Rate Is Below That of June

WIRE PRICES, PAGE 71

Chicago—Wire producers are pinning hopes on a betterment in merchant wire products sales by mid-August, when the seasonal farm repair work materializes in many sections. While mills profess to show a firming tendency in wire products prices, it is admitted no complete tests are being given by the existing slow spot market. Plain wire is 2.25c, Chicago or western mills, for plain wire to jobbers. No contracting of consequence occurs. July shipments unquestionably will be the lowest of the year.

Worcester, Mass.—The featureless summer market continues with little change. Third quarter specifications show little activity and there is a general lack of aggressiveness toward third quarter contracting. Highway construction is providing some outlet for rod production.

New York—Wire and nail buying is light. Nails are fairly steady at $1.80, Pittsburgh, while plain bright wire holds at 2.20c, Pittsburgh. Some volume is noted in wire specialties but demand is spotty.

Philadelphia—An advance in nails has been announced for July 15, when the minimum price will be $2, Pittsburgh. The present nail price continues $1.80.

Pittsburgh—Activity in wire products continues slow and below the June rate. Jobbers have curtailed stocks to an extremely low level and, like manufacturers, are depending upon mills for prompt delivery. Demand for manufacturer's wire is lighter in almost all industries and little improvement is looked for before August. Contracting continues quiet. Prices remain fairly steady at $1.80 to jobbers for wire nails, 2.20c, Pittsburgh, for plain wire and $35 for wire rods.

Cleveland—With little deviation in orders and shipments the wire market presents little of feature. Several mills have made fair progress in booking third quarter contracts, but they are the exception. Price changes are rumored here but without definite information backing such reports. Nails at $1.80 to $1.90 a keg are in largely an indeterminable market; plain wire is 2.20c, Pittsburgh. No award has been announced on the large fencing job at Akron, O., though bids have been submitted.

Valley Steel Products Corp., Detroit, has increased capital from $25,000 to $107,500.

Nut, Bolt, Rivet Buying Is Light but Steady

Bolts, Nuts, Rivets Prices, Page 71

Pittsburgh—Demand for bolts, nuts and rivets is steady, business so far this month comparing favorably with the June volume. Little improvement is looked for over the next four to six weeks. Prices remain 73 and 10 off for bolts and nuts and 2.75c, Pittsburgh, for large rivets.

New York—Operations in the East are 30 to 40 per cent. Prices are steady following recent reductions to 73 and 10 off list. Demand is light, although several large pending structural projects loom ahead. Rivets are firm and steady at 2.75c, Pittsburgh, but not active.

Philadelphia—Bolt and nut consumers generally have contracted for third quarter at 73 and 10 off list. The current rivet market is 2.75c, Pittsburgh, except for some shading on structural rivets.

Cleveland — Third-quarter contracting is virtually completed at the new figures of 73 and 10 off list for bolts and nuts. June sales volumes for all producers was far from a satisfactory month and now July gives indication of going under this total.

Chicago—Some western plants are resuming this week after a shutdown of about two weeks for inventory. Resumption average is barely 35 to 40 per cent. It is indicated that nothing like maximum contract specifications are being submitted, although the usual contract buyers have fairly well covered for third quarter. Structural and small rivet prices remain unchanged.

Hardware Association To Meet in Chicago

Announcement has been made that the thirty-seventh annual convention of the National Hardware Association of the United States and the American Hardware Manufacturers' association will be held Oct. 19-22 in Chicago at the New Palmer House. George A. Fernley, 505 Arch street, Philadelphia, is secretary-treasurer.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, No. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.26
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.00
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	17.50
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	17.76

FOUNDRY, NO. 1X

Buffalo fur., local del.	18.50
Eastern, del. Phila.	18.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	17.50
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	16.00 to 16.50
Pittsburgh, delivered	16.63 to 17.63
Eastern Penn., del.	16.75
Buffalo fur., local del.	16.50 to 17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	23.76 to 26.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.40 to 2.50
Connellsville foundry	3.25 to 4.50
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	8.70 to 9.10
Chicago, ovens	7.50
New England, del.	10.50
St. Louis, del.	8.50
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.00
Philadelphia, del.	8.75

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports	
Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	8.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	8.50 to 9.00
Newfoundland fdy., 55%	8.50
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	22 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$29.00 to 30.00
Pittsburgh, bessemer	29.00 to 30.00
Youngstown	29.00
Cleveland	29.00
Philadelphia	34.30
Chicago	30.00
Forging, Chicago	35.00 to 36.00
Forging, Pittsburgh	35.00 to 36.00
Forging, Philadelphia	39.30

SHEET BARS

Pittsburgh	29.00
Youngstown	29.00
Cleveland	29.00
Chicago	30.00

SLABS

Pittsburgh	29.00 to 30.00
Youngstown	29.00
Cleveland	29.00

WIRE RODS

Pittsburgh, Cleveland	35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	150.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

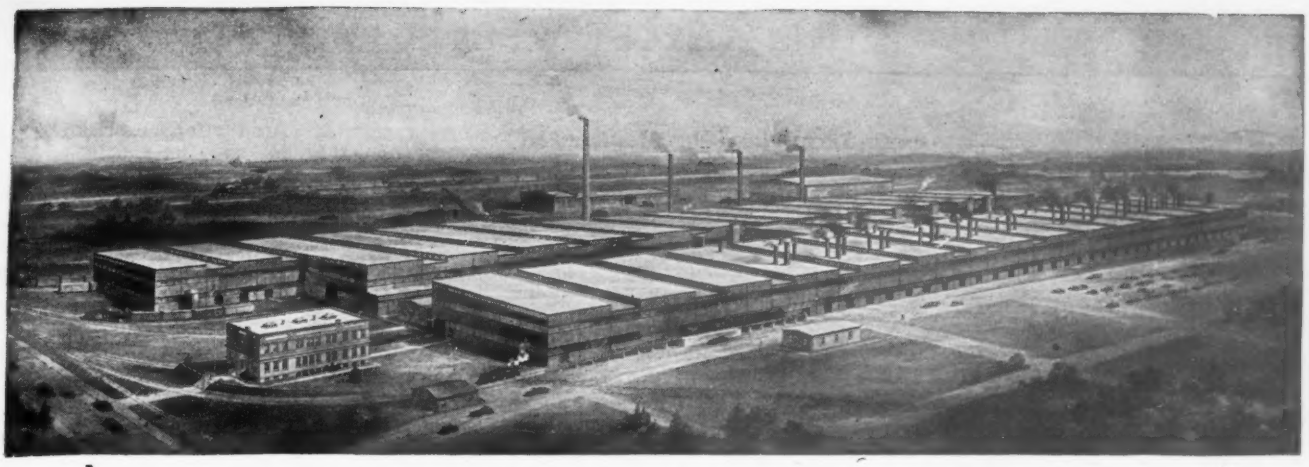
†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$13.50 to 14.00
Washed gravel, import duty paid east, tide, gross ton	18.50 to 19.00



NORMITE SHEETS

for difficult stamping operations

Automobile Sheets

Deep Drawing and Extra Deep Drawing—
Hood and Fender Finish—Body Stock.

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TOLEDO, OHIO
Dean Higgins & Co.
906 Board of
Trade Building

CINCINNATI, O.
Dean Higgins & Co.
Union Central Bldg.

EASTERN STEEL NORMITE SHEETS

The **EASTERN ROLLING MILL COMPANY**
BALTIMORE MD.

Pig Iron

Good Inquiries Developing in Middle West—Sales Are Fair—Buffalo Iron Easier in East

PIG IRON PRICES, PAGE 82

Pittsburgh—Demand for pig iron continues dull. Foundry requirements are lighter and new business is restricted to occasional carload lots. Shipments are declining slowly, and are smaller than a month ago. Prices lack strength, shading becoming more frequent, though inquiries are insufficient to provide a clear test. No. 2 foundry, malleable, basic and bessemer continue $17, base, valley.

Boston—Not more than 1000 tons of pig iron was sold in the New England district in the past week. Weakness is noted in Buffalo prices. In one instance $14.75, furnace, was done on No. 2X iron, though the usual price is $15. Inquiries are a little more numerous.

New York—Between 3500 and 4000 tons of pig iron is on active inquiry in this market, including 750 tons for the A. P. Smith Mfg. Co., Orange, N. J., for third and fourth quarters. Another interest is in the market for 1000 tons for the remainder of the year. Buying during the last two weeks has been heavy. It is estimated that about 7000 tons was sold in the week, compared with 9000 tons in the week preceding. Some shading of $15, base, Buffalo is reported. Southern iron is fairly steady at $16.50, New York docks, or $11, furnace. Bids are in on 470 tons of foundry for the navy department at Philadelphia, Charleston, Boston and Washington. A southern furnace was low on part while a Philadelphia interest was low on most of the iron. An eastern foundry, with large yard stocks, is reported making truck delivery within 50 miles.

Philadelphia—The pig iron market is quiet. Basic now is $16.75, delivered, eastern Pennsylvania. Eastern Pennsylvania foundry iron continues $16.50 to $17, base, furnace.

Buffalo—Little inquiry is current this week, that which is before producers being largely from eastern consumers and for small lots. Some sellers are quoting $16, base, furnace, for eastern shipment, though lower prices are noted. Five furnaces continue in production here.

Youngstown, O.—Pig iron purchases continue to be made sparingly. Small lots of bessemer and low phosphorus iron are sold occasionally. The price continues $17, valley furnace, for No. 2 foundry, basic, bessemer and malleable. Standard low phosphorus, coper-free iron brings $27, valley.

Cleveland—The market continues to reflect favorable signs first noted a week ago. Inquiries are fairly numerous, and for larger amounts than it has been customary for melters to buy. A Dayton, O., melter is in the market for 1000 tons; an inquiry from central Ohio is for 1000 tons. One lot of 1500 tons is wanted by a consumer in Michigan, and 1500 tons by a buyer in Indiana. Sales also are holding up. A lake furnace company booked 5000 tons in the past week. Cleveland furnaces are not doing much in the local territory. From present indications July shipments will be less than the June volume. Prices are steady at $17, base, furnace, for delivery in the Cleveland area; $16 to $17, base, furnace, in competitive Ohio and Indiana territory, and $17 to $17.50 in Michigan.

Cincinnati—Buying of pig iron in this district is light. Some business is going to lake furnaces, reported expanding their territory with attractive quotations.

Chicago—Shipments of pig iron are being held up as a result of the closing of the majority of western Michigan automotive foundries for the remainder of the month. Expected release of a block of steelworks pig iron for the merchant trade has failed to materialize. Occasional reduced price offers fail to affect the $17.50 market for base northern grades. Merchant production remains at barely 50 per cent. Three of the six available merchant stacks are active, these being two Iroquois and one Federal at South Chicago. Several fair-size inquiries are being figured for third quarter.

St. Louis—Shipping instructions have improved slightly, and it is believed the amount of pig iron to be shipped this month will approximate that in June. New purchasing still is restricted to small lots for prompt delivery. Inquiry is sluggish. Prices are unchanged.

Birmingham, Ala.—Sales have fallen to new low levels and furnace stocks have increased. Two more blast furnaces are scheduled to go out this month. Sellers are not making concessions to bring in business.

Toronto, Ont.—Merchant pig iron sales showed a slight gain in the past week, but no future buying is reported. Production is slowing up, though no furnaces have been blown out recently. Prices are steady.

Ferroalloy Specifications Held to Prompt Needs

Ferroalloy Prices, Page 82

New York—Low steel operating rates confine shipments of ferromanganese to small lots for immediate needs. Prices are unchanged at $85, duty paid, for carlots. Domestic spiegeleisen is $35, furnace, 19 to 21 per cent. Shipments of special ferroalloys such as vanadium, chrome and silicon continue light. Practically all business is on contracts and these remain unchanged in price. Earlier in the year a few adjustments were made, and lately producers have heard practically nothing from consumers on the subject.

Pittsburgh—Shipments of ferroalloys have dropped to a low rate comparable with the further decline in steelmaking operations. Specifications for ferromanganese and spiegeleisen are slightly smaller than a month ago while spot demand is negligible. Prices are unchanged, ferromanganese continuing $89.79 delivered, and spiegeleisen $30, furnace.

Tin Plate Operations Expected To Decline

Tin Plate Prices, Page 71

Pittsburgh—Tin plate operations, although fairly steady at about 65 per cent, are expected to go lower before the end of the month. Tin plate requirements for the annual pack of peas will be moderately smaller than the record 1930 volume, the season for the early pack having ended rather abruptly as a result of dry weather. Specifications for general line cans have been fair, but reflect industrial conditions. Tin plate continues $5, Pittsburgh, per base box.

Engineers Arrange Meeting

Plans are under way for the 1931 convention of the American Association of Engineers, which will be held at Huntington, W. Va., Sept. 28-30. The Huntington chapter will act as host to delegates. Engineers interested in the social and economic sides of the profession are invited to attend. Secretary of the association is M. E. McIver, 8 South Michigan avenue, Chicago.

Scrap

Resistance to Price Pressure Increases—Little Change in Quotations—Trading Is Light

Chicago — Resistance to lower prices in the steel scrap market seems well fortified. Even larger melters are pressing less vigorously for additional reductions, and dealers are little interested in operating on the decline. At the same time, no basis now exists for strength, although sentiment is favorable for an upturn at any justification that might appear. The feeling of large buyers that consumption of steelworks scrap is certain to increase materially by September or October is being reflected throughout the trade. Estimates are that Chicago district steelworks operations should reach 50 to 60 per cent by autumn, although it is believed 25 per cent operations in the interim are inevitable. It is felt a relatively satisfactory scrap market should result from even 50 per cent operations

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	$8.00 to $9.00
Boston, dealers	4.00 to 4.10
Buffalo, No. 1	9.00 to 9.50
Buffalo, No. 2	7.50 to 8.00
Chicago	**8.50 to 9.00**
Cinn., deal.	7.50 to 8.00
Cleve., No. 1	8.50 to 9.00
Cleve., No. 2	8.00 to 8.25
Det., No. 1 deal.	7.50 to 8.00
Det., No. 2 deal.	**6.00 to 6.50**
E. Pa. del. mill	8.00 to 9.00
N. Y. deal. R. R.	4.50 to 6.50
N. Y. deal. No. 2	3.50 to 4.00
N. Y. deal. yd.	4.00 to 4.50
Pitts., No. 1	10.00 to 11.00
St. L. No. 1 sel	**8.25 to 8.75**
Federal, Ill.	**8.00 to 8.50**
Granite City, Ill.	7.00 to 7.50
Valleys, No. 1	11.00 to 11.50

COMPRESSED SHEETS

Buffalo, dealers	7.50 to 8.00
Chicago	7.50 to 8.00
Cleveland	7.50 to 8.00
Detroit, dealers	7.00 to 7.50
E. Pa. new mat.	8.00 to 9.00
Pittsburgh	10.00 to 10.50
Valleys	10.50 to 11.00

BUNDLED SHEETS

Buffalo	5.50 to 6.00
Cinci., deal.	6.75 to 7.25
Cleveland	6.50 to 7.00
Eastern Pa.	6.50 to 7.00
Pittsburgh	8.00 to 8.50
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	4.00 to 4.50
Cincinnati	4.00 to 4.50
Detroit, dealers	4.00 to 4.50
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	11.00 to 11.25
Boston, dealers	3.00 to 4.10
Buffalo	12.00 to 12.50
Chicago (3 ft.)	10.00 to 10.50
Chicago (2 ft.)	10.75 to 11.25
Cinci., deal.	**13.00 to 13.50**
Detroit, deal.	11.00 to 11.50
Pitts. (open-hearth, 3 ft. and less)	12.50 to 13.00
St. Louis	12.00 to 12.50

STOVE PLATE

Birmingham	7.00 to 7.50
Boston, con.	5.00 to 5.50
Buffalo	7.50 to 8.00
Chicago, net	7.00 to 7.50
Cinci., deal. net	**4.50 to 5.00**
Det., net deal.	4.00 to 4.50
Eastern Pa.	7.50 to 8.00
N. Y., deal. mill	4.00 to 4.50
St. Louis	7.00 to 7.50

COUPLERS, SPRINGS

Buffalo	12.00 to 12.50
Chicago	10.00 to 10.50
Eastern Pa.	**13.00**
Pittsburgh	12.75 to 13.25
St. Louis	**8.75 to 9.25**

ANGLE BARS—STEEL

Chicago	9.75 to 10.25
St. Louis	8.25 to 8.75

LOW PHOSPHORUS

Buffalo, billets and bloom crops	14.00 to 14.50
Cleveland bil. and bloom crops	12.00 to 12.50
Eastern Pa.	13.50 to 14.00
Pittsburgh billet bloom crops	14.50 to 15.00
Pitts. sheet bar crops	13.50 to 14.00

FROGS, SWITCHES

Chicago	8.50 to 9.00
St. Louis	9.50 to 10.00

SHOVELING STEEL

Chicago	8.50 to 9.00
Cleveland	6.25 to 6.75
St. Louis	8.00 to 8.50

RAILROAD WROUGHT

Birmingham	**8.00 to 8.50**
Boston, dealers	**8.00 to 8.50**
Buffalo, No. 1	7.50 to 8.00
Buffalo, No. 2	9.00 to 9.50
Chicago, No. 1	**8.25 to 8.70**
Chicago, No. 2	**8.50 to 9.00**
Cinci., No. 2	7.50 to 8.00
Eastern Pa.	**10.00**
N. Y., No. 1, deal.	**9.00 to 9.50**
Pitts., No. 2	10.00 to 10.50
St. Louis, No. 1	5.25 to 5.75
St. Louis, No. 2	**8.00 to 8.50**

SPECIFICATION PIPE

Boston	**5.00 to 5.25**
Eastern Pa.	10.00 to 10.50
N. Y., deal	**6.00 to 6.50**

BUSHELING

Buffalo, No. 1	7.50 to 8.00
Chicago, No. 1	7.00 to 7.50
Cinn., No. 1 dl.	6.00 to 6.50
Cinn., No. 2	3.50 to 4.00
Cleve., No. 2	**6.00 to 6.50**
Det., No. 1 new deal.	5.50 to 6.00
St. L., No. 1	6.00 to 6.50
Val. new No. 1	10.00 to 10.50

MACHINE TURNINGS

Birmingham	4.50 to 5.00
Boston, dealers	0.60 to 1.00
Buffalo	4.75 to 5.00
Chicago	3.25 to 3.75
Cinn., deal.	3.75 to 4.25
Cleveland	4.50 to 5.00
Detroit	3.50 to 4.00
Eastern Pa.	5.00 to 6.00
N. Y., deal.	2.00
Pittsburgh	**6.50 to 7.00**
St. Louis	**3.50 to 4.00**
Valleys	7.50 to 8.00

BORINGS AND TURNINGS For Blast Furnace Use

Boston	0.50 to 0.80
Buffalo	5.75 to 6.25
Cinn., deal.	4.50 to 5.00
Cleveland	6.25 to 6.75
Detroit, deal.	3.50 to 4.00
Eastern Pa.	5.50
N. Y., deal.	2.00
Pittsburgh	6.75 to 7.25

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	4.50 to 5.00
Boston, chem.	7.00 to 7.25
Boston, deal.	0.60 to 1.00
Buffalo	5.75 to 6.25
Chicago	**3.50 to 4.00**
Cinn., deal.	3.75 to 4.25
Cleveland	6.25 to 6.75
Detroit, deal.	4.00 to 4.50
Eastern Pa.	**5.00 to 6.00**
E. Pa., chem.	11.50 to 12.50
N. Y., deal.	2.00 to 2.50
Pittsburgh	**6.75 to 7.25**
St. Louis	**5.00 to 5.50**

PIPE AND FLUES

Cinn., deal.	6.00 to 6.50

RAILROAD GRATE BARS

Buffalo	6.50 to 7.00
Chicago, net	5.75 to 6.25
Cincinnati	**5.50 to 6.00**
Eastern Pa.	7.50 to 8.00
N. Y., deal.	5.00 to 5.50
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, deal.	5.00 to 5.25
Buffalo	7.50 to 8.00
Cleve. ov. 10 in.	6.50 to 7.00
Detroit	5.75 to 6.25

FORGE SCRAP

Boston, del.	5.00 to 5.25
Chicago	11.50 to 12.00
Eastern Pa.	9.00 to 10.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	8.25 to 8.75

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	8.00 to 8.50
Chi., steelworks	7.50 to 8.00
Cleveland	6.75 to 7.00
Eastern Pa.	8.00 to 9.00
Pittsburgh	8.75 to 9.25
St. Louis	7.00 to 7.50

STEEL CAR AXLES

Birmingham	12.50 to 13.00
Boston, ship. pt.	11.00 to 12.00
Buffalo	15.50 to 16.00
Chicago	12.90 to 13.45
Eastern Pa.	18.50 to 19.50
St. Louis	13.00 to 13.50

SHAFTING

Bos., ship. pt.	10.00 to 10.50
Chicago	9.55 to 10.10
N. Y., deal.	12.00 to 13.00
St. Louis	9.50 to 10.00
E. Penna.	18.00

CAR WHEELS

Birming., iron	9.00 to 10.00
Boston, iron	14.00 to 14.50
Buffalo, iron	10.75 to 11.25
Buffalo, steel	11.75 to 12.25
Chicago, iron	10.00 to 10.50
Chi. rolled steel	11.00 to 11.50
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	12.00
E. Pa. iron	12.50 to 13.00
Pitts. iron	10.50 to 11.00
Pitts., steel	12.75 to 13.25
St. Louis, iron	7.75 to 8.25
St. Louis, steel	**10.00 to 10.50**

NO. 1 CAST SCRAP

Birmingham	9.50 to 10.00
Buffalo (mach.)	9.00 to 10.00
Boston, textile	10.00 to 10.50
Chicago, mach.	9.80 to 10.35
Chi., railroad	8.70 to 9.25
Chicago, agri.	8.40 to 8.95
Cinn., mach. cup., gross	12.25 to 12.75
Cleve. cupola	10.00 to 10.50
Det., net deal.	8.00 to 8.50
E. Pa. cupola	**12.50 to 13.00**
N. Y. cup. deal.	7.00 to 7.50
N. Y., del. local foundries	12.00
Pitts., cupola	10.00 to 10.50
San Fran., del.	13.50 to 14.00
Seattle	7.50 to 8.00
St. L. No. 1 ma.	9.00 to 9.50
St. L. No. 1	8.25 to 8.75

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	6.50 to 7.00
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	5.50 to 6.00
Eastern Pa.	**10.00 to 11.00**
N. Y. No. 1 dl.	7.00 to 7.50
N. Y. break. dl.	6.00 to 6.50
Pittsburgh	8.00 to 8.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	10.00 to 10.50
Chicago, agri.	9.00 to 9.50
Chicago, R. R.	9.50 to 10.00
Cinn., R. R. dl.	**11.00 to 11.50**
Cinn., agri., dl.	10.00 to 10.50
Cleveland, rail	10.00 to 10.50
Det. auto deal.	10.50 to 11.00
St. Louis, rail	**8.00 to 8.50**

RAILS FOR ROLLING 5 feet and over

Birmingham	10.50 to 11.00
Boston	7.50 to 8.00
Buffalo	10.00 to 10.50
Chicago	10.50 to 11.00
Eastern Pa.	11.50 to 12.00
New York	7.00 to 7.50
St. Louis	10.50 to 11.00

LOCOMOTIVE TIRES

Chicago, cut	11.50 to 12.00
St. L., No. 1	10.50 to 11.00

LOW PHOS. PUNCHINGS

Chicago	10.75 to 11.25
Buffalo	13.00 to 13.50
Eastern Pa.	13.00 to 14.00
Pittsburgh	13.50 to 14.00

THE SPECIAL ALLOY CASTING "MACHEMPITE"

FORGING STRENGTH
TOOL STEEL WEAR

"MacHempIte" has been developed to meet the heavy duty demands of modern Rolling Mill Practice.

"MacHempIte", when applied to Mill Pinions and Gears, gives increased life and economical service.

We have extensive modern gear cutting facilities. We are able to cut all kinds, types and sizes of Gears, Pinions, Worms and Worm Wheels, and can duplicate any pitch, tooth form, or helical angle.

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Garrison Division
PITTSBURGH, PA.

Midland Division
MIDLAND, PA.

Wooster Division
WOOSTER, OHIO

here. The prolonged slow trading has crippled machinery for collecting scrap from outlying small yards. Bookings during the week were at the lowest level this year. Shipments are down to about 25 per cent of a year ago. Melting steel remains at $8.50 to $9. Dealers are buying at $8.75. Little railroad scrap has come out in the last two weeks.

Boston—Prices of steel and iron scrap have held firm but practically no business was done. The Worcester consumer, which has been taking a fair amount of two or three grades, took hardly anything in the past week. There is no indication of improvement.

New York—Scrap prices have a firmer tone, and, while not reflected in advances, dealers' buying prices are steadier. Buying is light, but

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axle	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

less distress scrap is in sight. Some consumers are reported to have felt out the market for bargains with little success. No. 1 steel is being bought for Buffalo at $6.25 and the movement by barge to that district is steady. While as low as $4 is quoted for No. 1 steel based on the situation in eastern Pennsylvania, little scrap is being purchased in this market for shipment to that district. The Florence, N. J., foundry is buying breakable heavy cast and is in the market for an additional tonnage.

Bids went in this week on 300 tons of iron and steel scrap offered by the government at the Aberdeen proving grounds, Md., and another proposal offers to trade more scrap for powder.

Philadelphia—Dealing in steel and iron scrap is restricted to scattered lots. One or two consumers have embargoes but others are taking in limited quantities. One consumer has bought bundled sheets at 86.50, delivered, and this grade now is quotable at $6.50 to $7.

Buffalo—A melter who has not been in the market for some time has purchased a small tonnage of hydraulic compressed sheets at $7, the material being not strictly No. 1, according to dealers. Stove plate continues to sell at $8. Several leading dealers here have assumed a decidedly bullish attitude toward the market and are holding strictly No. 1 heavy melting steel for an absolute minimum of $9.50, they claim.

Pittsburgh—A fairly strong tone pervades the steel and iron scrap market but mills are slow to buy. Heavy melting steel is up 25 cents at $10 to $11. Dealers are able to buy occasional small lots at $10 but are unwilling to sell much below $11, at which some transactions have been made. Compressed sheets are nominally higher but quiet.

Cleveland—Conditions in iron and steel scrap continue depressed. No new buying is reported on the part of consumers and dealer activity has subsided. The largest independent user has scrap supplies for five months at its present rate and shows no indication of placing commitments. This interest is taking little, if any, material from its railroad source. The second independent is not expected to take steelmaking scrap for three months. Quotations are nominal and unchanged. Prices in Valleys continue unchanged at the higher level reached last week, although largely nominal. One mill has made purchases of No. 2 steel at $10 to $10.25.

Detroit—Prices of steel and iron scrap in this market are steady and unchanged, advances of last week being held. Conditions indicate a further advance shortly.

Cincinnati—Quotations on iron and steel scrap remain unaltered but are considered nominal in the present dull market. Shipments have tapered, with most buying close to requirements.

St. Louis—Due chiefly to activity on the part of dealers, the market for iron and steel scrap is exhibiting considerable strength. Purchasing by melters, however, continues quiet and on an absolute necessity basis.

Birmingham, Ala.—Buying continues light. Low quotations appear no inducement and melters are carrying light stocks. Prices are unchanged with the market in the hands of buyers.

Toronto, Ont.—General business in iron and steel scrap markets is at a standstill. Only a few small sales were made in steel grades during the week and shipments of heavy melting steel and turnings to the Hamilton district are negligible. Buying of iron grades is confined to small lots.

Coke

Demand for Furnace and Foundry Fuel Light—Effect of Coal Strike Is Wearing Off

COKE PRICES, PAGE 82

Pittsburgh—Reduced foundry operations resulting from the July 4 shutdown are restricting beehive coke shipments. The furnace grade is moving slowly, with the price of standard fuel usually $2.40. Foundry coke is $3.25 to $4.50. The coal market is quiet, and the effect of the strike is diminishing.

Boston—The market for coke remains quiet. Foundries do not anticipate improvement in operations until fall.

Cincinnati—Demand for by-product foundry coke is tending to shrink slightly, reflecting a light melt in foundries.

New York—Demand for coke is light. Prices are unchanged with beehive furnace $2 to $2.25, Connellsville. By-product foundry coke ranges from $8.70 to $9.10, Newark, N. J.; $10.50, New England, and $8.75, Philadelphia. Premium brands are fairly steady at $4.50, Latrobe, Pa., or $4.30, Connellsville. Standard grades of beehive foundry are unchanged at $3 to $3.25, Connellsville.

Chicago—Heavy stocks of by-product foundry are accumulating at ovens. The active period for contracting for the last half is about completed. Producers are unwilling to extend contracts into 1932. The price at ovens remains $7.50.

St. Louis—Demand for metallurgical coke continues to lag, and no improvement is expected before the middle of August. The market for steam coal is quieter than at any time since 1929, additional mines in Kentucky and Illinois having closed.

Birmingham, Ala.—Coke consumers continue to buy small lots as required, and prices are steady. Few contracts for future delivery have been received recently.

Pacific Coast

Golden Gate Bridge Awards Held Up Until Bonds Are Sold—Large Tonnage Affected—Northwest Sales Decline in Second Quarter—California Nail Prices Meet Foreign Rates

San Francisco—(*By Air Mail*)—Interest last week was centered around the anticipated awards July 8 for the Golden Gate bridge project. The building committee ratified all of the low bids, with the exception of two, and publicly announced its intention to place the awards at the meeting of the board of directors July 8. At that time bids were opened for the purchase of bonds, but only one financial institution submitted a bid and this bid was not in accordance with specifications. As a result, awards to the low bidders were postponed until the bonds were sold.

The usual midsummer inactivity is noted and demand is at a low ebb. Further price concessions have been made in some lines. Producers of wire nails, in order to meet the keen competition of foreign makers, have announced the new low level of 2.40c, f.o.b warehouse, for any quantity of 4 to 60 penny common nails; on 4 to 20 penny in smooth boxes and on 6 to 8-penny finishing nails. Discount on extras, however, applies only on carload lots. On all other sizes 2.65c f.o.b. warehouse, applies on small lots and 2.475c is quoted on carload lots.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Bars, Plates and Shapes

Several fair sized reinforcing steel bar awards were placed during the week. The total exceeded 2100 tons. Among the larger lots, placed with unnamed interests, were 614 tons for a sewage treatment plant and 350 tons for a hotel at Phoenix, Ariz. An unknown interest was awarded 260 tons for the widening of a bridge over the Santa Ana river in Riverside county, Calif. Sub-bids are being taken on 900 tons for the war memorial and opera house, San Francisco. Out-of-stock prices continue unchanged at 2.60c, base, on carload lots in the San Francisco district and at 2.50c, base, in Los Angeles territory.

Demand for plates remains quiet and most pending business and new inquiries are confined to lots of less than 100 tons. The Salt Lake City pipe line, involving 1000 tons of 30 and 36-inch welded steel pipe, was placed with an unnamed interest by the general contractor, Morrison-Knudsen Co. The award of 300 tons for floating derricks for Mare Island was placed with an unstated interest. The only pending business of importance calls for 250 tons for a pipe line for the Vista Irrigation district, Vista, Calif., bids on which will be opened July 24. Prices have weakened and while 2.00c, c.i.f., is nominal, some business has recently been placed as low as 1.85c.

The only structural award of note this week called for 450 tons for 300 car underframes for the Pacific Fruit Express Co., San Francisco, placed with the Pacific Coast Engineering Co. The Herrick Iron Works booked 150 tons for an apartment on Market and Laguna streets, San Francisco. Sub-bids are being taken on 860 tons for the post office at Salt Lake City and on 450 tons for an office building in Los Angeles. Plain shapes range from 2.05c to 2.15c, c.i.f.

Other Finished Materials

Activity in cast iron pipe is more pronounced but bookings so far this year are considerably below the total for the same period in 1930. To date this year 39,350 tons have been placed, as against 50,000 tons for the corresponding period a year ago. The American Cast Iron Pipe Co. took 831 tons of 20 and 24-inch for Vallejo, Calif. San Francisco placed 716 tons of 4 and 6-inch with the National Cast Iron Pipe Co. and 886 tons of 8 and 12-inch with the United States Pipe & Foundry Co. The Pacific States Cast Iron Pipe Co. was low bidder on 2365 tons of 2 to 8-inch pipe for Oakland and Grinnell Co. was low bidder on 750 tons of 16-inch pipe for the same city. Burbank, Calif., has opened bids on 266 tons of 20 and 24-inch pipe.

Little of importance has transpired in the sheet market, sales and inquiries being confined to small lots. Blue annealed, No. 10 gage, is quoted at 2.50c, c.i.f. No. 24 gage hot rolled annealed holds at 3.00c and No. 24 gage galvanized sheets are quoted at 3.50c, c.i.f.

Northwest Trade Shrinks

Seattle—Awards of steel products in the Pacific Northwest during second quarter show a decline in cast iron pipe, concrete bars and structurals while plates made a slight gain compared with the first three months. Tonnages of 100 tons or more totaled 20,413 in the second quarter as against 32,727 in the first three months. For the half year the awards in the Pacific Northwest were 53,140 tons compared with 61,690 in the corresponding period of 1930. Comparisons follow:

	Second quarter 1931	First quarter 1931	First half 1931	First half 1930
Reinforcing	2,940	5,626	8,566	13,190
Plates	7,665	5,225	12,890	11,560
Shapes	5,760	7,825	13,585	21,509
Pipe (cast iron)	4,048	14,051	18,099	15,431
	20,413*	32,727	53,140	61,690

*Not including 660 tons of steel rails and 500 tons track spikes.

Bars, Plates and Shapes

Mill prices of all items remain unchanged. Demand has not improved and few projects of importance are up for figures. Northwest Steel Rolling Mills has closed both furnaces and mill for July. Pioneer Sand & Gravel Co. booked a small order for a local commercial building, no large awards having been placed for some time. Unnamed interests have taken an unstated tonnage of reinforcing materials involved in the Farmers' National Grain Corp.'s 750,000-bushel grain elevator building at Spokane. The government will furnish 201 tons of reinforcing materials and 25 tons of shapes for the Thief Valley dam, Oregon.

Northern Pacific Railway will rebuild the Duwamish river bridge, Seattle, and has awarded to Wallace Bridge & Structural Steel Co., Seattle, the contract for furnishing 800 tons of structurals. Local plants are short of work but are figuring on the approximately 4000 tons involved in the Seattle federal building, bids July 21.

Pipe Demand is Light

Several municipal requisitions for cast iron pipe are pending but no awards were made during the week. Seattle has opened bids for two city improvement projects involving 738 tons of 8, 12 and 20-inch cast iron pipe. Olympia, Wash., has awarded miscellaneous pump discharge and meter piping to Hydraulic Supply Mfg. Co., Seattle.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
½	58	44½	½	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1—1¼	31	15
			1½—2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7—8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7—8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. Direct mill shipments, base, 5 and 2½. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f. o. b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$35.00 to 36.00
Four-inch, Birmingham .... 39.00 to 40.00
Four-inch, Chicago ..... 45.00 to 47.00
Six to 24-inch, Chicago..... 42.00 to 44.00
Six-inch and over, N. Y..... 34.50 to 36.50
Four-inch, New York ..... 39.50 to 40.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.00c
Chattanooga	3.10c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.60c
Portland	3.15c
San Frans.	2.40c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	2.75c
Cincinnati	3.00c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.00c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.00c
Cleveland	2.10-2.25c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.20c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	2.60c to 2.85c
San Fran.	3.65c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	3.70c
Chicago	3.55c
Cincinnati	3.75c
Cleveland	3.60c
Detroit	3.50c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.40c
Pitts.**	3.30c
Portland	4.50c
San Fran.	4.15c
Seattle	4.25c
St. Louis	3.80c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.10c
Chicago (local del.)	4.35c
Chicago (outside)	4.35-4.60c
Cincinnati	4.25c
Cleveland	4.00c
Detroit	4.00c
Houston	5.40c
Los. Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	3.85c
Pitts.**	3.90c
Portland	5.00c
San Fran.	4.65c
Seattle	4.75c
St. Louis	4.35c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.35c
Chattanooga	3.30c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	2.95c
Portland	3.50c
San Fran.	3.75c
Seattle	3.50c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.50c
Cincinnati	3.75c
Cleveland	3.55c
Det. No. 14 & lighter	3.65c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	3.60c
Seattle	4.90c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.10c
Cincinnati	3.50c
Cleveland	3.10c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.10c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.50c
St. Paul (a)	3.85c
St. Louis	3.35c
Tulsa	4.75c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	5.65c
Cincinnati	5.80c
Clev. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

TRADE
C C
MARK
Cleveland-Cliffs

Iron Ore
Pig Iron
Coal-Coke

THE CLEVELAND-CLIFFS IRON CO.
Cleveland, Ohio

Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 8.00c, Conn., for copper

Sheets	
Yellow brass (high)	15.50
Copper, hot rolled	17.87½
Lead, full sheets (cut ½c more)	8.25
Zinc sheet (100-lb. base)	9.00
Tubes and Pipes	
Seamless yellow brass (high)	20.37½
Seamless copper	20.37½
Rods	
Yellow brass (high, full turnings)	13.75
Naval brass	14.87½
Anodes	
Copper, untrimmed	15.37½
Wire	
Yellow brass (high)	16.00

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	4.75 to 5.00
Chicago	5.00 to 5.50
Cleveland	5.25 to 5.50
St. Louis	5.25
Heavy Yellow Brass	
New York	3.00 to 3.25
Heavy Copper and Wire	
New York	5.75 to 6.00
Boston	5.50 to 5.75
Chicago	5.25 to 5.75
Cleveland	5.25 to 5.50
St. Louis	5.50 to 5.75
Red Brass Borings	
New York	4.25 to 4.50
Yellow Brass Tubing	
Cleveland	3.25 to 3.50
Light Copper	
New York	4.75 to 5.00
Chicago	4.75 to 5.25
Cleveland	4.75 to 5.00
St. Louis	5.25
Light Brass	
Boston	2.25 to 2.50
Chicago	2.75 to 3.25
Cleveland	2.25 to 2.50
St. Louis	3.00 to 3.25
Zinc	
New York	1.25 to 1.50
Cleveland	1.25 to 1.50
St. Louis	1.50
Aluminum	
Clippings, soft, Cleveland	12.00 to 13.00
Clippings, hard, Cleveland	10.00 to 10.50
Borings, Cleveland	4.50 to 5.00
Mixed cast, Cleveland	4.50 to 5.00
Mixed cast, Boston	3.75 to 4.00
Mixed cast, St. Louis	4.00

Secondary Metals

Remelt alumnium No. 12	9.00 to 10.50
Brass ingots, 85-5-5-5	8.12½

Metals

Uncertainty Rules in Market as Copper Prices Drop—Lead and Zinc Are Steady—Tin Is Weak

New York—Nonferrous metals are passing through a period of extreme nervousness, largely on account of uncertainty in European affairs. Prices have fallen off on several of the metals this week but remain unchanged on lead, aluminum and nickel.

While copper has fallen back to its previous low prices, lead, zinc and tin retain large parts of their recent recoveries. When copper producers dropped their quotations Saturday to the basis of 8.00c, Connecticut, where custom smelters had been for several days, mill products were cut ¼ to ½-cent a pound. Brass ingot prices were cut ⅛ to ¼- cent Monday. These cuts place all products on the 8-cent basis.

Copper—Producers have cut quotations ½ cent in the past week, but other sellers have cut below 8.00c to as low as 7.50c. June statistics were decidedly weak, though the increase in stocks was not so large as expected. Stocks of refined increased nearly 15,000 tons, while stocks of blister decreased 3225 tons. Total stocks are 600,827 tons, more than two-thirds being refined. Production showed practically no change in June, while shipments showed a slight increase. Domestic shipments were a little over half the average monthly shipments of 1929. Production and shipments this month are expected to show little change, so further substantial increase in stocks is indicated.

Zinc—Prime western zinc has been in an indifferent market the past few days at 3.85c to 3.90c. Producers generally have not pressed sales. Here and there a little offering of prompt has set the market back. In addition the firming influence of curtailment, producers are sentimentally encouraged by the organization of the new cartel in Europe. The ore market was unchanged last week at $23 a ton.

Tin—Tin has dropped back about 2 cents from its recent top on account of nervousness over the European financial situation. Conditions within the market have improved, with lighter shipments from the Straits.

Lead—New business has been quiet, but prices are firm on account of recent large sales and an expected improvement in June statistics.

Aluminum—New business is quiet, but prices are steady.

Coke By-Products Demand Holds Up; Prices Steady

New York—Demand for toluol is holding well, lower automobile output having failed to be reflected in the movement of this by-product. Demand for other distillates is steady, but in light volume. Prices are firm, with no large stocks accumulating due to limited output. Phenol is spotty, but shows a slight gain in some quarters. Napthalene is in a seasonal lull. Sulphate of ammonia is dull with some shading reported.

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.18 to 0.19
90 per cent benzol	0.18 to 0.19
Toluol	0.27 to 0.29
Solvent naphtha	0.24 to 0.25
Commercial xylol	0.24 to 0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.60

Quicksilver $94

New York—Quicksilver is quiet, about $94 a flask for small spot lots. Larger lots are quoted lower.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
July 8	8.00	8.62½	7.87½	25.35	25.65	4.40	4.22½	3.90	22.90	6.95	35.00
July 9	8.00	8.50	7.85	25.00	25.37½	4.40	4.22½	3.87½	22.90	6.85	35.00
July 10	8.00	8.50	7.85	25.62½	26.00	4.40	4.22½	3.90	22.90	6.90	35.00
July 11	8.00	8.12½	7.85	25.25	25.62½	4.40	4.22½	3.90	22.90	6.90	35.00
July 13	8.00	8.12½	7.85	24.87½	25.25	4.40	4.22½	3.90	22.90	6.90	35.00
July 14	7.75	8.00	7.50	24.80	25.12½	4.40	4.22½	3.90	22.90	6.90	35.00

Europe

Continental Markets Continue to Strengthen—British Steel Output Gains, Pig Iron Down

London—(*By Cable*)—For the third consecutive week reports from the Continent indicate a firming up of iron and steel prices. This has developed since the moratorium on war debts was proposed, and indicates no lessening in the importance attached to the proposal in Germany, Belgium and France. STEEL's correspondent at Berlin reports export demands are reviving, and prices gaining strength. In Belgium the general tone of the markets is improving; semifinished steel and plates are stronger. Good orders are being received from Holland and India. An increase in orders for forward delivery is noted by mills in France.

Despite optimistic reports from the Continent the slump in British business continues. The market for tin plate appears brighter, good export inquiries developing. Demand for galvanized sheets is slightly better. Orders for heavy steel are unsatisfactory. Two blast furnaces in Staffordshire have discontinued operations. The depression in the iron industry in that district is unprecedented. Makers complain of considerable dumping of foreign iron.

The daily rate of pig iron production in Great Britain in June was 10,793 tons, compared with 11,179 tons in May, and 10,733 tons in April. Total output for June was 323,800 tons. Seventy-six stacks were in blast at the close of the month, a net loss of four in the month. Output of steel ingots and castings on a 30-day basis in June averaged 14,296 tons, compared with a daily average of 14,035 tons in May and 13,167 tons in April, an encouraging gain.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, July 13	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**	$14.24	2 18 6*	$11.81	2 8 6	$11.81	2 8 6	$11.87	2 8 9
Basic-bessemer	14.61	3 0 0†	11.08	2 5 6	11.08	2 5 6	13.39	2 15 0
Hematite, Phos. .02-.05	15.34	3 3 0	.....	.....	.....	.....	17.05	3 10 0
SEMIFINISHED STEEL								
Billets	$25.57	5 5 0	$16.07	3 6 0	$16.07	3 6 0	$16.07	3 6 0
Wire rods	41.40	8 10 0	25.57	5 5 0	25.57	5 5 0	25.57	5 5 0
FINISHED STEEL								
Standard rails	$40.18	8 5 0	$31.66	6 10 0	$31.66	6 10 0	$31.66	6 10 0
Merchant bars	1.52c	7 0 0	.79c	3 11 6	.79c	3 11 6	.80c	3 12 6
Structural shapes	1.68c	7 15 0	.74c	3 7 6	.74c	3 7 6	.75c	3 8 0
Plates	1.79c	8 5 0	.91c	4 2 6	.91c	4 2 6	.90c	4 2 0
Sheets, black, 24 gage	1.90c	8 15 0	1.76c	8 0 0	1.76c	8 0 0	1.79c	8 2 6
Sheets, gal., 24 ga. corr.	2.12c	9 15 0	2.20c	10 0 0	2.21c	10 0 0	2.31c	10 10 0
Bands and strips	2.06c	9 10 0	.92c	4 3 9	.92c	4 3 9	.94c	4 5 0
Plain wire, base	2.06c	9 10 0	1.10c	5 0 0	1.10c	5 0 0	1.10c	5 0 0
Galvanized wire, base	2.39c	11 0 0	1.35c	6 2 6	1.35c	6 2 6	1.38c	6 5 0
Wire nails, base	2.39c	11 0 0	1.10c	5 0 0	1.10c	5 0 0	1.10c	5 0 0
Tin plate, box 108 lb.	$3.41	0 14 0	.....	.....	.....	.....	$ 8.28	1 14 0

			French Francs		Belgian Francs		Rentenmarks	
Domestic Prices at Works or Furnace—Last Reported								
Fdy. No. 3 Pig Iron**	$14.24	2 18 6	$11.76	300(2)	$12.83	460	$17.94	78
Basic pig iron	14.61	3 0 0	12.74	325(1)	11.58	415	19.67	85.50
Furnace Coke	2.68	0 11 0	5.68	145	5.16	185	4.92	21.40
Billets	25.57	5 5 0	19.21	490	17.72	635	25.41	110.50
Standard rails	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.32c	127
Merchant bars	1.63c	7 10 0	.83c	460	.82c	630	1.33c	128
Shapes	1.90c	8 15 0	.99c	550	.81c	620	1.30c	125
Plates	1.95c	9 0 0‡	1.26c	700	.94c	725	1.53c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.19c	1,215	1.82c	1,400	1.22c	117
Sheets, gal. 24 ga., corr.	2.12c	9 15 0	2.39c	1,325	2.47c	1,900	3.43c	330
Plain wire	2.06c	9 10 0	1.98c	1,100	2.08c	1,600	2.15c	207
Bands and strips	2.06c	9 10 0	1.10c	610	1.40c	1,075	1.54c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 11s 0d ($2.68) f. o. b. Ferromanganese £17 9s 6d ($84.93) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.

British Steel in Better Demand; Gives No Profit

Birmingham, Eng.—Most markets continue apathetic but the rise in tin and spelter has had a beneficial effect upon trade in South Wales. Tin plate works have been restarted at Duffryn and Glantawe and export demand shows a definite improvement. Two more furnaces are also to be started at the Swansea Vale Spelter Works. Prices of tin plate have appreciated to 14s ($3.40) and 14s 3d ($3.46).

Foreign competition is acute in the Continental market, especially from Germany but shipments from Swansea last week were up by 40,000 boxes. Galvanized sheets have not shown the same improvement and mills are standing idle owing to lack of orders. Some works are prepared to accept £9 15s ($47.33) for a good shipping order but most manufacturers regard this as an unprofitable price.

The Continental market has steadied and merchant prices at Birmingham are several shillings higher than before the announcement of the Hoover debt moratorium. For 2-inch billets £4 2s ($19.92) is being asked, £4 12s 6d ($22.47) for small steel bars, £4 9s ($21.62) for joists and £4 11s 3d ($22.17) for Belgian No. 3 iron. Without actually withdrawing from the market Belgian and French houses have not been eager to sell. Some merchants are willing to cut the prices mentioned but that is because they bought on a lower level and are anxious to make sales.

Quick Delivery Is Wanted

The British steel trade is stagnant. Some large steel concerns in the Black Country are operating for only a short period each week. They are receiving small orders invariably accompanied by demand for immediate delivery, often an impossible request in view of the difficulty of arranging rolling programs.

The Steel association meets about the middle of the month and some consumers are hoping for a cut in prices. This, however, is regarded as most unlikely by steelmakers themselves. It would be certain that if lower prices were ordered steel production could be done only at a loss. Both home and export business is restricted and while consumption is low price concessions would not bring out business.

In the Sheffield district the posi-

CUT CRATING COSTS WITH BOLTS

Containers for bulky, heavy articles can be simplified with the use of R B & W bolts and nuts

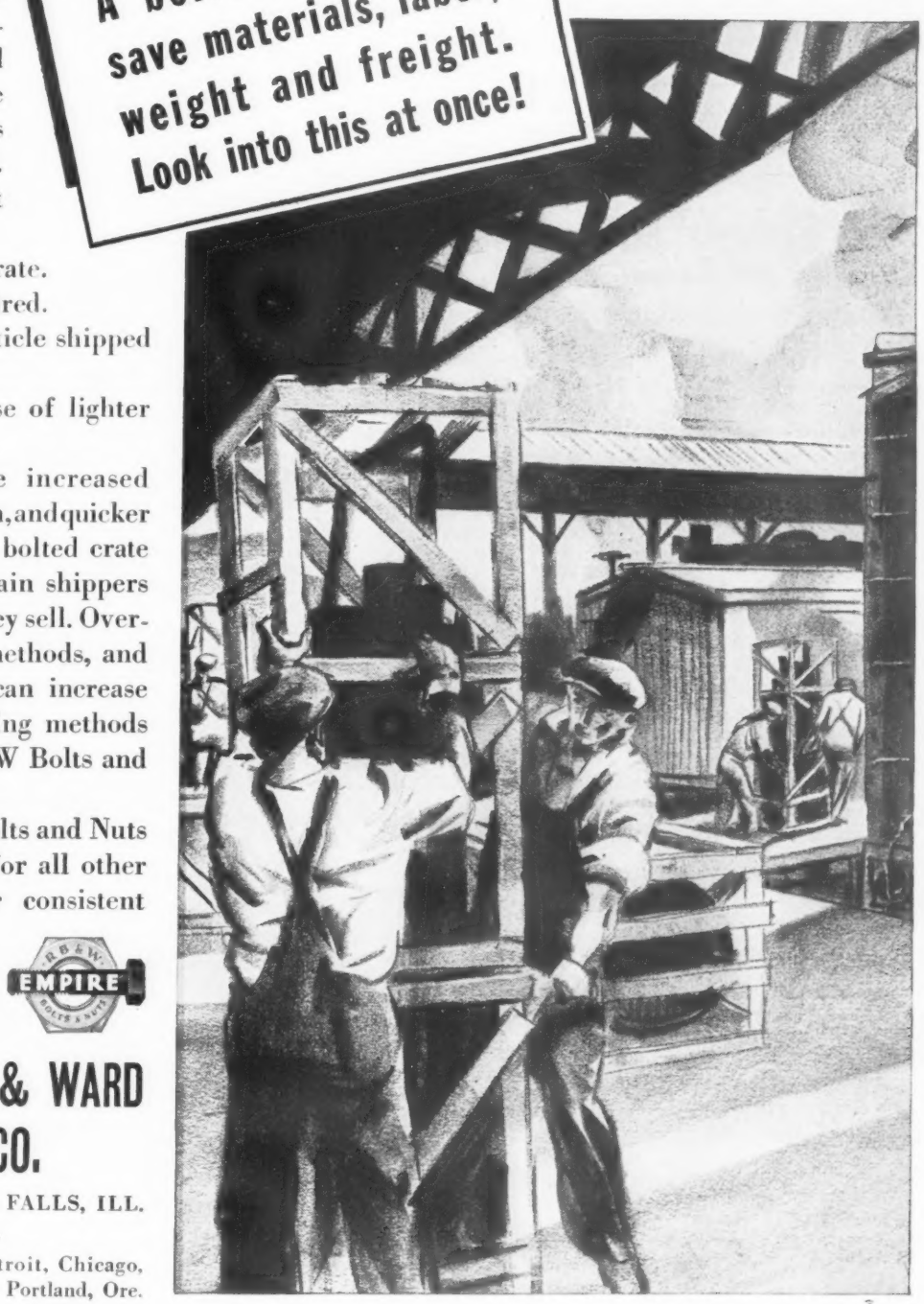
SHIPPERS!
A bolted crate can save materials, labor, weight and freight. Look into this at once!

To reduce the cost of your shipping containers, consider the use of R B & W Bolts and Nuts. Numerous shippers of heavy machinery and other bulky objects have saved money in several ways by adopting bolting material. Here are a few savings that can be accomplished:

1. Less wood required in crate.
2. Less time and labor required.
3. Less gross weight per article shipped in the crate.
4. Less freight paid because of lighter weight.

Corollary advantages are increased strength and added protection, and quicker unpacking at destination. A bolted crate is often used again, by certain shippers who erect the equipment they sell. Overhaul your shipping room methods, and see for yourself how you can increase efficiency by modern packing methods aided by the use of R B & W Bolts and Nuts.

You will find R B & W Bolts and Nuts the best to use for this as for all other purposes, because of their consistent high quality, uniform strength and ease of assembly.



RUSSELL, BURDSALL & WARD BOLT & NUT CO.

PORT CHESTER, N. Y., ROCK FALLS, ILL.
CORAOPOLIS, PA.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.

tion has been brightened by the receipt of inquiries through the Chinese government purchasing commission for railroad materials, including steel sleepers, wire rods, permanent way tools, files, steel bars, plates and angles. It is understood that only British tenders will be considered.

The pig iron position in the Midlands shows no expansion. Furnacemen are making the most of the opportunity to compete with Middlesbrough makers as the latter have maintained prices on the old basis for second half. A few small orders are being booked with Midland founders but even the largest is not taking more than about half the usual tonnage.

Northampton producers are selling outside the controlled area at low prices and are thus able to dispose of output which otherwise would go into stock. Middlesbrough exports during June showed little variation from the record of the past four months and it is doubtful whether the present rate of output can be maintained much longer.

Czech Steelmaker Earns Dividend and Bonus

Prague—Skoda works at Plsen made a net profit of 67,831,231 crowns ($2,000,000) during 1930. In addition to the dividend of 5 per cent provided for by the articles of association, a bonus of 74 crowns ($2.20) per share was declared. During the financial year a modern works was built near Letnany for the aviation company of Avia, which was founded and is controlled by the Skoda concern. Another affiliated company, Societe Anonyme pour l'Industrie Automobile, has considerably increased its sales, notwithstanding the trade depression. It is reported that the rationalization of various works has been responsible for a decrease of 70,000,000 crowns ($2,075,000) in the wages bill.

Profits Are Plowed In

London — It is reported from Vienna that the Alpine Montangesellschaft will not declare any dividend for the financial year 1930. The net profit amounted to 7,410,000 shillings ($1,040,000), and the whole of this has been set off against amortization. In 1929 the dividend was 4 per cent. The decrease in the output of the company's works is estimated at 37 per cent.

German Output Fairly Even

Berlin—The output of pig iron in Germany in May exceeded that in April, and output of steel ingots and castings was a shade above that of April. The output of finished steel in May fell sharply from April. Comparisons follow, in metric tons:

Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings	Finished steel
1913*	204	910,000	993,000	970,000
1928	101	985,000	1,210,000	881,000
1929	95	1,117,000	1,354,000	940,000
1930	63	808,000	962,000	679,000
1931				
Jan.	61	603,104	772,776	539,850
Feb.	53	520,176	759,633	527,436
Mar.	56	560,005	811,146	583,428
April	58	529,161	743,341	527,686
May	59	554,648	744,459	494,651

*In present boundaries.

Belgian Tonnage Holds

Brussels—Output of pig iron in Belgium in May was 271,040 metric tons, compared with 257,500 tons in April, and 299,510 tons in May, 1930.

Output of steel ingots and castings in May was 250,610 metric tons, against 250,670 tons in April, and 294,100 tons in May, 1930. The total for May this year was composed of 245,570 tons of steel ingots and 5040 tons of steel castings. The production of finished steel in May was 185,640 metric tons, compared with 199,600 tons in April, and 240,900 tons in May, 1930.

Production of metallurgical coke in May was 416,680 metric tons, against 410,430 tons in April, and 475,050 tons in May last year. Comparisons follow, in metric tons:

Mon. ave.	Coke	Act. Furn.	Pig iron	Steel ingots and castings	Finished steel
1913	294,000	.....	207,000	205,000	155,000
1928	494,000	.....	325,000	328,000	281,000
1929	499,000	58	341,000	344,000	296,000
1930	447,000	44	283,000	282,000	232,000
1931					
Jan.	417,100	45	270,360	263,120	173,290
Feb.	380,130	44	240,210	227,880	193,010
Mar.	420,360	43	263,260	247,670	200,010
Apr.	410,430	46	257,500	250,670	199,600
May	416,680	44	271,040	250,610	185,640

French Coke Totals Down

Paris—The output of coke in France in April declined from March. Imports of coke were also less, coming mainly from Germany, Holland and Belgium. Comparisons follow, in metric tons:

Mon. ave.	Production	Imports	Exports
1913.....	335,620	255,835	17,085
1928.....	366,660	447,330	34,810
1929.....	397,435	453,720	39,070
1930.....	421,235	380,460	27,505
1931			
Jan.	423,789	326,007	23,116
Feb.	397,964	330,094	27,836
March	432,436	351,534	23,099
April	408,928	300,433	19,844

German Steel Exports Less

Berlin—Exports of pig iron and ferroalloys from Germany in April slightly exceeded those of March, and exports of other iron and steel products fell off sharply. Scrap exported in April was 19,745 metric tons.

Scrap imported in April amounted to 9631 tons. Comparative figures follow, in metric tons:

Mon. ave.	IMPORTS Pig iron and ferro-alloys	IMPORTS Other iron and steel	EXPORTS Pig iron and ferro-alloys	EXPORTS Other iron and steel
1928	25,535	174,250	24,585	394,575
1929	14,765	137,435	36,115	448,330
1930	14,340	94,320	19,000	380,500
1931				
Jan.	9,962	68,329	9,842	362,912
Feb.	9,125	80,394	8,116	318,228
March	8,934	84,135	7,612	360,940
April	10,419	89,857	8,271	335,877

British Trade Is Adverse

London—Exports of pig iron and ferroalloys from Great Britain in May were at the highest mark for the year to date, but exports of other iron and steel products declined sharply from April.

Imports of pig iron and ferroalloys in May increased over April and imports of other iron and steel products in May made the highest figures for the year to date. Comparative figures follow, in gross tons:

Mon. ave.	IMPORTS Pig iron and ferro-alloys	IMPORTS Other iron and steel	EXPORTS Pig iron and ferro-alloys	EXPORTS Other iron and steel
1928	9,935	231,390	37,895	317,210
1929	12,310	222,410	45,430	319,520
1930	26,010	216,355	26,445	236,715
1931				
Jan.	23,345	198,428	18,743	148,630
Feb.	20,836	156,220	13,840	129,685
March	22,777	187,690	15,836	154,453
April	26,101	167,289	13,707	174,158
May	27,674	200,083	22,032	145,512

British Production Grows

London—Production of pig iron, ingots and castings in Great Britain in May exceeded those of April by a comfortable margin, although far below the totals for May, 1930. Comparisons follow, in gross tons:

Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913.....	338*	855,000	638,600
1928	132	550,800	710,000
1929.....	162	632,400†	803,000†
1930.....	76	516,400	608,200†
1931			
Feb.	81	318,200	486,400
March	81	357,100	500,100
April	78	323,200	397,400
May	80	346,500	435,100

(*) Average for year.
†Revised figures.

Russian Output in May

Russian soviet government gives May production statistics as follows: 410,400 tons of iron, 273,200 tons of steel, 704,600 tons of rolled steel, 569,400 tons of coke, 839,700 tons of iron ore, 44,900 tons of manganese ore and 3,910,300 tons of coal.

STEEL SHOW ISSUE—SEPTEMBER 10, 1931

Information

General

The National Metal Congress (American Society for Steel Treating Exposition) will be held at the Commonwealth Pier, Boston, September 21-25. The following technical societies will participate:

American Society for Steel Treating
American Welding Society
Iron & Steel Division, A. S. M. E.
Machine Shop Section, A. S. M. E.
Iron & Steel Division, A. I. M. & M. E.
Institute of Metal Division, A. I. M. & M. E.

Naturally STEEL will play a prominent part in co-operating to make this Thirteenth Annual Metal Congress a success. The issue of September 10 will carry the complete advance details of exposition and convention. This issue will be in the hands of readers 10 days before the convention opens—ample time to make plans.

This issue will bring the convention and exposition to those who cannot attend.

Publication

A feature of the September 10 issue of STEEL will be a combined editorial and advertising section devoted to the same interests as the National Metal Congress.

Those advertisers desirous of appealing to these same interests will find unusual value in being properly represented in the special section of this issue.

This interest value is not confined to the readers of STEEL who attend the Boston Exposition, but extends in even larger measure to those similarly interested who do not attend, thereby depending more largely upon STEEL to bring the Exposition to them.

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COLOR

Two colors will be used—red and black—printed on India tint coated stock.

RATE

Including color and insert position—$150 a page for regular advertisers—$175 per page one time.

CLOSING DATES

Final forms close Tuesday, September 1. Reservation and copy requiring composition should be in Cleveland not later than Monday, August 24.

STEEL

For forty-eight years—IRON TRADE REVIEW

Published Every Thursday

CLEVELAND · NEW YORK . PITTSBURGH . CHICAGO . LOS ANGELES . LONDON

Machinery

INQUIRIES and purchases of government navy yards constitute about the only feature of a dull summer market which finds most builders and dealers striving to be content with marking time until fall in the hopes of buying being stimulated then. Occasional rush orders enforce sporadic increases in working forces, but this situation is not general. Russian and Italian interests are reported inquiring for grinders. Chicago and St. Louis education boards are inquiring for sizable amounts of various machine tools, despite the uncertain financial condition of many metropolitan administrative departments. No general weakness has appeared in price conditions.

New York—Inquiry for machine equipment from general industrial plants is light. A few tools are pending for government shops in the East. July thus far has been the dullest month in a long time with most builders and dealers. There are a few exceptions, but with industrial schedules curtailed in most instances, buyers are not interested in new machinery. Refrigeration builders are slowing up slightly, although one maker is producing 7000 weekly. How long this rate will continue is a matter of conjecture. Ball bearing operations are best described as "marking time."

Pratt & Whitney plant at Hartford, Conn., has increased operating forces irom old employes to get out a rush order for gear working equipment for General Motors Corp. Delivery was stressed in placing this business, it is reported. The Dunkirk, N. Y., fabricator of heavy steel also is reported fairly active on some recent good business, but this shop bought rather heavily of new equipment some months ago. Grinding machinery plants also are included in the current lull, although one eastern plant is working near full time on old orders.

Triplex Machine Tool Corp. here submitted the low bid on one motor-driven radial drill press for Brooklyn navy yard, $7160. Joseph T. Ryerson & Son Inc., was low on a bending brake machine for Brooklyn with $5980.

Brown & Sharpe Mfg. Co., Providence, R. I., has been awarded two automatic screw machines at $5077 each and one at $5737, for Frankford Arsenal, Pa. Bids on automatic screw machines taken June 15 were rejected. Lloyd & Arms Inc., Philadelphia, was awarded one steel finishing lathe at $4560.

Worcester, Mass.—Domestic inquiry remains dull. Russia and Italy are again in the market for grinders, and Ford of Canada has placed a machine here for truck manufacture. Some inquiry arises from sources in Chicago and Philadelphia for single machines, and the Ford plant at River Rouge is inquiring for machines. There is, however, from the latter inquiry no indication of Ford's plans for future production.

The Brooklyn navy yard order for about 36 lathes still is pending and during the week inquiry arrived for five lathes for the Mare Island yard and two for the Puget Sound yard on the Pacific coast. Toledo, O., schools are inquiring for 12 lathes.

Third quarter prospects show little in the way of improvement over the first half year record and while some advance may come in the fall months, indications are that the machinery market will show little vigor this year.

Plans for the proposed pickling plant which it was reported the American Steel & Wire Co. would install in the South Works here apparently have been abandoned for this year at least.

Pittsburgh—Machine tool activity is fairly steady at a quiet rate but shows no signs of early improvement. The volume of business is light and consists of single tools. Westinghouse Electric & Mfg. Co. continues to show some activity in orders and inquiry but railroad purchases are lacking almost entirely. Orders from steel companies are limited mostly to special mill equipment.

Cleveland—Opinion is heard here that July will mark the low point of the recession in machinery buying, this idea being substantiated by the fact that sales of new machinery have held at about the same level for the past 60 days. Fairly good business in repair work and parts is reported.

One dealer states that his business this month is about 60 per cent below the same month in 1930 and nearly 90 per cent off from July, 1929. No inquiries of any size are up and it is the general expectation that present levels will continue through August, with mild increases looked for in September.

Chicago—While a number of machine tool dealers in this territory have more business on their books than in the corresponding period last month, no appreciable improvement is noted, and none is expected before late next month. Chicago board of education is understood to have recommended the purchase of 23 lathes and other equipment for the Austin High school, to cost about $16,800, but the purchase actually may not be made for some time because of the board's financial difficulties.

Illinois department of purchases has ordered $6000 worth of equipment for a state orphanage at Normal, Ill., and about $50,000 to $60,000 worth of tools will be bought by the St. Louis board of education, probably within the next month. In northern Wisconsin an industrial plant bought five small lathes, and a production shop in Chicago shortly may buy four to five presses and other equipment.

Great Northern railroad is in the market for an air compressor, and Chicago & Western Indiana for a pipe machine. Analysis of government bids indicates some weakness in prices, but so far this has not extentded to quotations on the few private inquiries for standard equipment that appear in the market.

June Hoist Orders Off

New York—Electric Hoist Manufacturers' association reports the number of hoists ordered during June decreased 27.719 per cent, compared with the previous month. The value of such orders decreased 25.032 per cent, compared with May. Shipments in June were 4.675 per cent over the May total.

Tide Turned, Says Woodin; Will Survive, Schwab Avers

IT SEEMS that the tide has definitely turned," said W. H. Woodin, president, American Car & Foundry Co., New York. "The crop situation is not so bad. I hope this fall will see some buying by the railroads. I have an idea the railroads are going to get their freight rate increase, but it is going to be slow."

□ □ □

"If we stop speculating on how close 'just around the corner' good business is, it will probably be here before we are ready for it," declares Charles M. Schwab, chairman, Bethlehem Steel Corp., Bethlehem, Pa.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New York

BROOKLYN—Shop will be built at Eastern Parkway and Washington avenue by Brooklyn Institute of Arts and Sciences, Academy of Music building, Lafayette street. Cost is estimated at $45,000. Plans are by McKim, Mead & White, 101 Park avenue, New York.

BROOKLYN—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6094 for one universal grinder, on schedule 6095 for one high speed metal sawing machine, on schedule 6108 for one horizontal milling machine, on schedule 6109 for one heavy duty keyseating machine and on schedule 6118 for one die filing and sawing machine.

BUFFALO—Aluminum & Metal Products Corp. has been incorporated with $25,000 capital by W. H. Hartzberg, Prudential building.

NEWBURGH—Hudson Valley Iron Works has been incorporated with $10,000 capital by P. Cantline.

NEW YORK—Construction quartermaster, Mitchell field, Long Island, will receive bids July 23 for erection of machine shop, assembly shop, maintenance shop, warehouse and other units.

NEW YORK—Department of water, gas and electricity, municipal building, will build a service building at St. Nicholas avenue and 155th street, at a cost of approximately $70,000. J. E. Kleist, 25 West Forty-fifth street, is architect.

NEW YORK—National Screen Service Inc., 125 West Forty-sixth street, plans to build a 7-story plant and office building at 346 West Fortieth street. Structure will be 98 x 100 feet. J. M. Berlinger, 232 Madison avenue, is architect. Approximate cost, $250,000.

NEW YORK—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6102 for four portable arc welding sets, on schedule 6099 for one metal planer, and on schedule 6100 for one 48-inch radial drill.

SYRACUSE—Syracuse Light Co., South Warren street, has let contract for a new office and shop building on Erie boulevard. Cost is estimated at $750,000.

New Jersey

BAYONNE—Electrofreezer Corp. has been incorporated with $50,000 capital by Israel Lipschitz, 473 Broadway, to manufacture electrical freezing apparatus.

LAKEHURST—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6148 for one industrial electric furnace for hardening, tempering and annealing steel and alloys and carburizing of steel.

Pennsylvania

FLEETWOOD—Fleetwood Corp. has been incorporated with $15,000 capital by John DeMaree, 316 South Twenty-second street, Allentown, Pa., to manufacture and sell refrigerators, refrigerator equipment and store equipment.

HAMBURG — Hahn Motors Inc., whose incorporation recently was noted, advises through E. C. Smith that the company plans to manufacture fire apparatus and to add a line of commercial trucks, from 1½ tons up. Manufacture of standard and custom bodies will be undertaken also. (Noted July 2.)

HARRISBURG—State department of highways, Sam Lewis secretary of highways, will purchase equipment to cost $1,500,000 for maintenance project to start August 15. Among other items are 32 air compressors, 18 conveyors, 50 air drills and 16 centrifugal water pumps.

PHILADELPHIA — White Motor Truck Co., Twentieth street and Erie avenue, has closed bids for plant alterations.

PHILADELPHIA—I. T. E. Circuit Breaker Co., Nineteenth and Hamilton streets, has closed bids for the erection of a plant unit. J. Fletcher Street, 1120 Locust street, is architect.

PHILADELPHIA—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6064 for one box type electric furnace.

PHILADELPHIA — Philadelphia Electric Co., 1000 Chestnut street, will build a substation on Allegheny avenue. John T. Windrim, Commonwealth building, is architect. Contract is held by United Engineers & Constructors Inc., 112 North Broad street. Approximate cost, $150,000.

PITTSBURGH—Fort Pitt Flask Equipment Co. has been incorporated with $250,000 capital by C. H. Curry, Coraopolis, Pa., to manufacture foundry flasks.

PITTSBURGH — Builders Products Co., 1503 Investment building, whose incorporation recently was noted, advises through Howard M. Nichols that at the present machinery is being leased. Two heavy punch presses, drill press and other items may be purchased next spring. Robert Jones is president of the company. Plant is located at Beaver Falls, Pa. (Noted July 2.)

SHARPSBURG—City council has authorized surveys in connection with proposed improvements to the municipal light and power plant. B. R. Shover, Oliver building, Pittsburgh, is engineer.

WASHINGTON— Jessop Steel Co. advises that it is extending present buildings to allow for installation of an additional electric melting furnace, two new annealing furnaces and a three-ton forging hammer.

Ohio

ADA—Engine room and equipment including crushers, of the Taylor Stone Co. recently were damaged by fire. Plant will be rebuilt immediately.

BELLEFONTAINE—Board of commissioners, Logan county, has let contract for construction of a pumping station in the Indian Lake district to Tradler Construction Co., Poland, O. K. B. Allen is consulting engineer. Cost is estimated at $10,000.

CLEVELAND—City, George B. Sowers engineer, will start preliminary construction for a $12,000,000 sewage treatment plant to be built at the foot of East 140th street. Project will require three years for completion. George B. Gascoigne, Leader building, is consulting engineer.

LISBON—City council is having estimates prepared for erection of a municipal light and power plant.

NEW PHILADELPHIA—C. E. Whelland proposes to build a new hangar at Schoenbrunn airport. Unit will be 54 x 70 feet.

ST. MARYS—St. Marys Foundry plans construction of two additional plant units at a cost of about $54,000. First unit will be 40 x 150 feet and second 30 x 120 feet, both to be built in September or October. Capacity of plant will be doubled.

Indiana

TERRE HAUTE—Frank H. Reynolds Co. Inc. has been incorporated with $10,000 capital by Frank H. Reynolds and Ralph A. Edwards to conduct a general foundry and machine shop business.

Michigan

DETROIT—Budd Wheel Co., 12141 Charlevoix avenue, has a building permit for erection of a plant addition. Cost is estimated at $25,000.

DETROIT—Super Tool Co., Boyer building, has been incorporated with

$40,000 and 10,000 no par shares by Emil Brocker, 20117 Exeter street, to manufacture and deal in tools and machinery.

DETROIT—Faigle Tool & Die Co. Inc., 180 South Campau avenue, has been incorporated with 50,000 no par shares by Karl Faigle, 1764 Field avenue, to manufacture and deal in dies, wood and metal patterns.

IMLAY CITY—Imlay City Mfg. Co., recently noted as being organized here, has been incorporated with $25,000 and 20,000 no par shares by Howard E. Reid, John Folk, and W. B. Onyon, to deal in and manufacture iron, steel, copper and other metals. Company will operate foundry. (Noted April 30).

OLIVET—Board of trustees, Olivet college, plans construction of a power house to cost $35,000. Bowd & Munson, Lansing, Mich., are engineers.

Illinois

AURORA—Sound Equipment Operating Co. will establish a plant here in buildings on an eight-acre site formerly occupied by Fox River Iron Co. Sound Equipment company will employ about 100, and manufacture semi-portable sound motion picture projectors. D. E. Knowles, 2426 Lunt avenue, Chicago, is president.

CHICAGO—Elting & Stair Inc., 205 West Wacker drive, has been incorporated with $30,000 capital by Harold S. Walters, 134 South LaSalle street, to make vending machines and mechanical devices.

CHICAGO—Ero Mfg. Co., 2234 Ogden avenue, will move operations to 714 West Monroe street, where a 7-story plant has been leased. Floor space will be doubled. Company manufactures automotive accessories and outboard motors.

CHICAGO—Chain Link Fence Corp., 211 West Nineteenth street, has been incorporated with 1000 no par shares by Milton H. Sachsel, 155 North Clark street, to deal in iron, steel, wire and wood products.

CHICAGO—Rose Aeroplane & Motor Co., 4363 Kenmore avenue, has been incorporated with $80,000 and 9000 no par shares by Cavender, Milchrist & Kaiser, Burnham building, to deal in aeroplanes and motor devices.

CHICAGO—Lindsay Light Co., C. R. Lindsay Jr. president, 161 East Grand avenue, has secured a plant in West Chicago for consolidation of its Chicago plants. Floor area totals 88,000 square feet. Company manufactures chemicals, gas mantles, lamps and electrical equipment.

CHICAGO—Jefferson Electric Co., Fifteenth and Laflin streets, has acquired a site at Twenty-fifth avenue and Madison street, in Bellwood, a suburb. Company will build a manufacturing plant with floor space of 250,000 square feet. Cost is estimated at $550,000. Company manufactures electrical parts and supplies. Olsen & Urbain, 228 North LaSalle street, are architects.

Southern States

WILMINGTON, DEL.—Gear Equipment Machinery Co. has been incorporated with 250 common shares by the Corporation Trust Co. to deal in machinery and mechanical devices.

WASHINGTON—Potomac Electric Power Co., Tenth and E streets northwest, is considering construction of an auxiliary power plant. Initial construction would involve only one unit. Total project would cost approximately $5,000,000. Generators, boilers, stokers, etc., are included in the plans.

JACKSONVILLE, FLA.—McMullen Airways plans to build a hangar and repair shop at the South Jacksonville air terminal.

NEW ORLEANS—Service Foundry Inc., 1153 South Peters street, advises through B. J. Peters, that contract for new structure recently noted has been let to Pittman Construction Co. Unit 48 x 175 feet will replace one destroyed by fire. Equipment needs will be governed by the amount of machinery not harmed by fire. (Noted July 9).

SHREVEPORT, LA.—Southwestern Gas & Electric Co. will enlarge its local power plant by installation of an 18,750 kilowatt generating unit. Sargent & Lundy, 20 North Wacker drive, Chicago, are engineers.

CHARLOTTE, N. C.—John T. Hardaker, Bradford, Eng., is reported to be planning organization of a company here for the establishment of a textile machinery plant, to be built at the corner of Fourth and Poplar streets. Boone D. Tillett, Law building, is local representative.

BEDFORD, VA.—Structure containing machinery of the Continental Can Co., Pershing Square building, New York, recently was damaged by fire. Loss is estimated at $20,000.

CLARKSBURG, VA.—C. H. Russell & Son Inc. is reported to be in the market for a welding machine for welding bands.

NORFOLK, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6116 for three drill presses and on schedule 6153 for 100 pneumatic scaling hammers.

Missouri

SPRINGFIELD—Highway Steel & Mfg. Co. has been incorporated with $20,000 capital by Claud C. Cox, court house.

ST. LOUIS—Sachs Corp. has been incorporated by Milton R. Sachs, 6416 Cates street, to manufacture electrical appliances.

ST. LOUIS—Universal Tile & Metal Structure Co. has been incorporated by Thomas W. White, 506 Olive street.

Oklahoma

MIAMI—Velvet Mining Corp. has been incorporated with $3000 capital by W. J. Richards, Baxter Springs, Kans.

Texas

BEAUMONT—Jefferson Steel Co. has been incorporated with $5000 capital by Charles G. Steele Jr.

HARLINGEN—Valley Neon Corp. has been incorporated with $5000 capital by C. C. Tyler, to manufacture signs.

SAN ANTONIO—Browning-Ferris Machinery Co., 205 Exposition avenue, Dallas, Tex., has acquired a site of 18,700 square feet on South Flores street here, for the erection of a warehouse.

SAN ANTONIO—Automatic Signal Service Corp., Western National building, whose incorporation recently was noted, advises through J. E. Crosby, secretary-treasurer and general manager, that the company will produce automatic signal devices from parts and materials purchased, assembly to be made at the company's plant, 630 Montana street. Parts used will include slow speed one-sixteenth horsepower motors, small spur tooth gears and worms. Company will correspond with manufacturers of electric door locks, thermostats, relays, door and window electric contacts and electrical supplies. Ellis I. Haynes, inventor of the device, is president and production manager. (Noted June 4).

Wisconsin

GRESHAM—C. J. Ebert, president of municipal council, will receive bids until July 20 for construction of a hydroelectric plant and equipment, to include one 125 kilovolt-ampere, 60 cycle, 2300-volt generating unit driven by a water wheel.

KENOSHA—William E. O'Brien, city manager, will receive bids about Aug. 1 for one 12,000,000-gallon high lift pumping unit and one low lift unit of same capacity. Bids will also be received for construction of a $250,000 incinerator plant. Alvord, Burdick & Howson, 20 North Wacker drive, Chicago, are consulting engineers.

RACINE—Nelson & Paulson, manufacturers of sheet metal products, are starting work on the erection of a shop addition, 40 x 90 feet, on Lathrop road.

Minnesota

LITTLE FALLS—State, E. A. Walsh adjutant general, 108 state capitol, St. Paul, will build a hangar unit here. Cost is estimated at $23,000. P. C. Bettenberg, Little Falls, is architect.

ST. PAUL—Universal Piston Co. has been incorporated with $100,000 capital to manufacture aluminum pistons for internal combustion engines. Fred C. Nelson, 1283 Dayton avenue, is president and P. M. Reiland of the Reiland Brothers Foundry, 494 Dunlap street, is secretary. Additional equipment will

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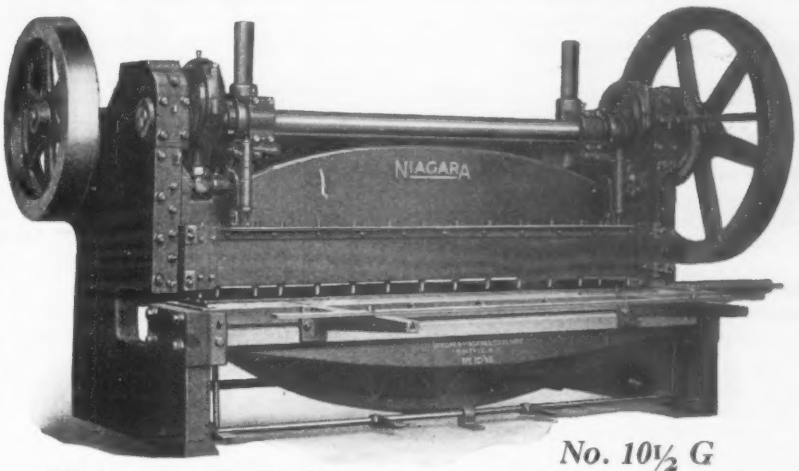

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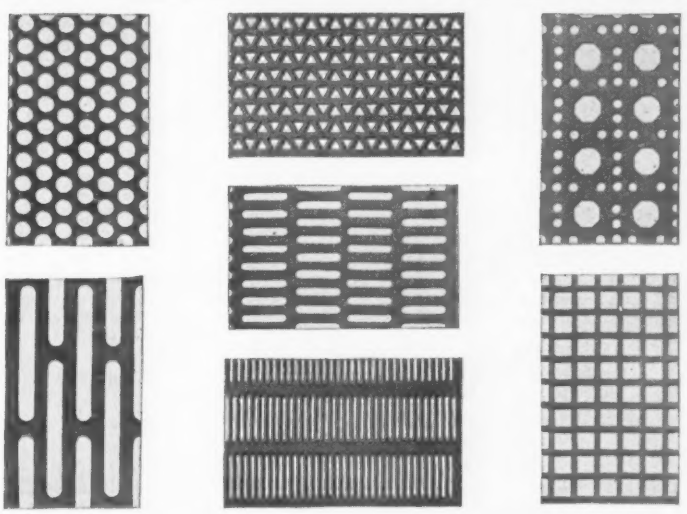

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Pacific Coast

ALAMEDA, CALIF.—Owens-Illinois Glass Co., 133 Kearny street, San Francisco, is having plans prepared for erection of a plant here, to include shops. Cost is estimated at $1,500,000. Plans are private.

ANAHEIM, CALIF.—City, E. B. Merritt clerk, will receive new bids for a deep well turbine pump and motor.

CALEXICO, CALIF.—Theodore R. Byl, city engineer, advises concerning waterworks improvements that bids will be called for one 1000 gallons per minute centrifugal pump to operate at 140-foot head. (Noted June 25.)

LOS ANGELES—O'Keefe & Merritt Co., 3700 Mines avenue, proposes to build a plant addition for the manufacture of stoves. Unit will be 100 x 120 feet. G. J. Fosdyke, 1708 South Ardmore avenue, is engineer.

MARE ISLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6049 for one horizontal boring, drilling and milling machine.

OAKLAND, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids July 21 on schedule 6096 for 16-inch motor-driven lathe.

SAN JOSE, CALIF.—San Jose Cement Co. Ltd., E. H. Dettmer president, 835 Howard street, San Francisco, has let contract to Hunt-Mirk & Co., 141 Second street, San Francisco, for a plant to be built here at an approximate cost of $2,250,000.

SEATTLE—Atlas Iron Craft Works Inc. has been incorporated with $3000 capital by E. A. Weissenborn and B. Zavac, 1018 Alaska building.

SEATTLE—Western Chromium Co. has been incorporated with $43,000 capital by George R. Cooley, 714 Fourth avenue.

SILVERTON, WASH.—Lamba Chemical Products Co. has been organized here by O. R. and L. A. Dahl, Baltimore, Md., to mine and deal in ores and minerals.

SPOKANE, WASH. — Armstrong Machinery Co. is considering plant expansions and improvements. Approximate cost, $60,000. Company manufactures ice machinery.

TACOMA, WASH.—Western Ornamental Iron Inc. has been organized with $10,500 capital by E. N. Davidson.

Dominion of Canada

KAMLOOPS, B. C.—Department of public works will install a high pressure boiler and coal stoker in connection with alterations to present power plant. Approximate cost, $40,000.

VANCOUVER, B. C.—C. Brakenridge, city hall, will call for bids soon for pumping equipment to be installed in the sewage disposal plant here.

VANCOUVER, B. C.—British Columbia Electric Railway Co. Ltd. proposes to develop hydroelectric plants on the Campbell river, for the production of 175,000 horsepower. Plans have been submitted to J. C. MacDonald, provincial water comptroller. Project is to include an 18,000-horsepower unit at Trout Pool, a 93,500-horsepower unit at Elk Falls and a 46,500-horsepower unit at Lodore Falls. Total cost of the project is estimated at $10,000,000. E. E. Carpenter, care of the company, is engineer.

BRAMPTON, ONT.—C. M. Corkett, city clerk, is receiving bids for mechanical equipment, sludge pump with motor, air compressor and motors.

CHESLEY, ONT.—G. W. Grabb, city clerk, will receive bids until July 24 for a deep well pump with capacity of 300 gallons per minute, and a motor.

DESERONTO, ONT.—Clapperton Sons Ltd., 29 Melinda street, Toronto, Ont., proposes to rebuild its plant here for the manufacture of glass.

PORT ARTHUR, ONT.—Diamond Iron Works of Canada Ltd. has been incorporated with $40,000 capital by William F. Langworthy, to manufacture machinery.

SARNIA, ONT.—W. B. Beatty, city engineer, is receiving bids for pumps and equipment for installation in a new pumping unit being erected here.

MONTREAL, QUE. — Shawinigan Water & Power Co. Ltd., 107 Craig street west, proposes to build a hydroelectric power plant on the upper St. Francis river.

MONTREAL, QUE.—Silent Glow Oil Burner Corp. of America, Leo L'Esperance secretary, 6320 St. Hubert street, plans to build a manufacturing unit.

MONTREAL, QUE.—Plants of Ventilating Co. of Canada Ltd., 5 Olier street, and Engine Works & Trading Inc., 2 Dock street, recently were damaged by fire.

PORT ELIZABETH, QUE.—Bids will be received July 23 by municipal council for centrifugal sewage pumps direct coupled to electric motors, and other equipment.

New Trade Publications

STEEL—A new general catalog has been issued by the Steel Company of Canada, Ltd., Montreal, Que., and Hamilton, Ont. It has been brought down to date and the form altered to give it the greatest convenience in use.

VERTICAL STEAM ENGINES—A bulletin has been issued by the E. H. Wachs Co., 1535 Dayton street, Chicago, on its vertical self-oiling steam engines. Full illustration show the engines and their details. Data tables are included.

BEARINGS — Steel-backed babbitt-lined bearings are described in Bulletin S-349 of the Wagner Electric Corp., 6400 Plymouth avenue, St. Louis. The bulletin discusses the problem of bearing seizure in electric motors, the superiorities of babbitt bearings and similar topics.

VARI-SPEED MOTOR PULLEY—Reeves Pulley Co., Columbus, Ind., has issued a bulletin on its vari-speed motor pulley for direct application to motor shaft, in compact form, capable of infinite variation and accurate in speed. Operation of the device is explained and drawings show its application. A table of speeds is included.

FITTINGS—Carrick Engineering Co., 431 South Dearborn street, Chicago, has issued a bulletin on its stiff-arm fittings for its system of automatic combustion control. They are used for rigid connections between the regulating units and the devices which are to be controlled. Positive operation thus is assured.

MATERIAL HANDLING—Link-Belt Co., Chicago, has issued its material handling and power transmission data sheet, No. 3. It is designed to give assistance in selecting the positive drive. It includes roller chain, silent chain, herringbone speed reducers, herringbone gears, positive variable speed transmissions and malleable iron and steel chains.

TRAMRAIL—Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O., in a current leaflet calls attention to details of its tramrail equipment for industrial use and varieties of application.

INDUSTRIAL HEATING—Bulletin No. 294 by the W. S .Rockwell Co., 50 Church street, New York, is devoted to a study of the economics of industrial heating, taking into consideration the quality and overall cost of the heat-treated product, working conditions for the operatives, and influence of the heat-treating process on the operation of the plant as a whole. It suggests that the real problem of the manufacturer is selection of the fuel or electric equipment best suited to his individual requirements.